SOUTH ENTRANCE ROAD
(Grand Canyon Route #2)
Between south park boundary and Village Loop Road
Grand Canyon National Park
Coconino County
Arizona

HAER No. AZ-45

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
P.O. Box 37127
W&ashington, D.C. 20013-7127

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HISTORIC AMERICAN ENGINEERING RECORD

SOUTH ENTRANCE ROAD
(Grand Canyon Route #2)
HAER No. AZ-45

Location:	South Entrance Road begins at the park's south boundary and runs north to the Canyon rim, thence west through the administrative area to its terminus at Village Loop Drive. Coconino County, Arizona. UTM A: 12 3983430 398800 /Park boundary UTM B: 12 3990640 397795 /Village Loop Int. Tusayan East USGS Quadrangle, 1981 Grand Canyon, Arizona USGS Quadrangle, 1988 Phantom Ranch USGS Quadrangle, 1988
Date of Construction:	1928, 1954
Type of Structure:	National park entrance road
Use:	National park entrance road
Designer/Engineer:	U.S. Department of Agriculture, Bureau of Public Roads (BPR). U.S. Department of Interior, National Park Service (NPS).
Builders:	James Vallandingham, Salt Lake, UT (1928) Givens Construction Co, Phoenix, AZ (1954) Sorensen Construction Co, Murray, UT (1957) Fisher Contracting Company (1954)
Owner:	NPS, Grand Canyon National Park (GCNP)
Significance:	The 1928 alignment of South Entrance Road is significant as an early example of the cooperative agreement between the NPS and BPR to build quality automotive roads within national parks. The 1954 alignment is significant as the first park road built in response to growing numbers of visitors following World War II in the Mission 66 style of utilitarian structures.
Project Information:	Documentation of South Entrance Road is part of the NPS Roads & Bridges Recording Project, conducted in summer 1994 under the co-sponsorship of GCNP and HABS/HAER. This report was researched and written by Michael F.Anderson, HAER historian, September 1994.

INTRODUCTION

The 7.42-mile South Entrance Road as aligned and constructed in 1953-54 serves as the principal entrance to Grand Canyon National Park. It is, however, only the latest in a series of approach and entrance roads worn or constructed from the transcontinental National Old Trails Highway (U.S. 66) since the late nineteenth century. The evolution of these roads reflects transitions from horse-drawn stages to automobiles; from only a few hundred annual park visitors in the 1880s to nearly a million by the middle 1950s.

Within this report, the two roads built to automotive standards in 1927-28 and 1953-54 are considered in detail. The 1928 road represents the park's first attempt to accommodate (and attract) growing numbers of motoring tourists. It served for nearly thirty years as the only automotive approach from the south, and a portion--Center Road--still serves as an internal park road and alternate entrance. The NPS built the 1954 replacement road along an entirely new alignment in response to heavier and escalating numbers of vehicles which placed greater physical demands on the roadway, and in order to redirect traffic from a direct to an oblique approach to Grand Canyon Village.

HISTORICAL CONTEXT

The difference between a park entrance road and a park approach road originates in recent times with considerations of land management, building costs, and maintenance responsibilities. In years prior to the 1930s, and even within that decade, park administrators used the very terms *approach* and *entrance* interchangeably, understanding full well that one meant little without the other. Prior to 1919 when Grand Canyon National Monument became a national park, the distinction had no meaning at all--roads simply started at a convenient point and ended somewhere along the rim. Private entrepreneurs built these roads at little cost and they quickly became what are called in Arizona "public" roads: belonging to no one and maintained by whoever happened to use them or, sporadically, by a generous county government.

A multitude of roads--some formal, others not--approached and entered Grand Canyon from the south before it became a national park. One of the first was a wagon road from Flagstaff, built in the middle 1880s by Philip and William Hull--homesteaders and shepherds who lived south of the rim near Grandview Point. This road which served early tourist developments near Grandview evolved into a regular stage road by 1892, and by the turn of the century had been extended westward down Long Jim Canyon, to Rowes

Well, and north to the rim at today's village. By 1913, during the first years of automotive travel, a branch road emanated from this roundabout approach and struck directly north from a point close to today's south entrance station to enter the village very nearly along the current alignment. The "Flagstaff-Grandview" road along with its automotive terminal segment never consisted of more than a 14'-wide bladed dirt roadway, but served visitors from Flagstaff in diminishing numbers until 1928.[1]

Two more early stage approaches before the turn of the century are attributed to William Wallace Bass. Bass maintained a tourist camp near Havasupai Point 26 miles west of today's village, and his roads--one from Williams by 1889 and one from Ash Fork in 1894--at first reached Bass Camp only. When the railroad approached the south rim during the years 1898-1901, Bass constructed a connecting road from the west to the railroad line, then used the developing road north along the tracks past Rowes Well to transport his customers to the south rim. Bass's roads had for the most part fallen into disrepair by 1910 and were likely never traversed by automobiles other than his own.[2]

Still another approach road developed early along the Grand Canyon Railway tracks from Williams to the south rim. Beginning as a stage route for south rim tourism operators Martin Buggeln and Sanford Rowe, the "Williams-Grand Canyon" automotive road developed over time, apparently more from use by locals than deliberate construction by any government agency. Ultimately, Coconino County and the U.S. Forest Service began to spend a few dollars on maintenance between Rowes Well and the rim (the "entrance" portion used as the terminal segment of each of the earliest "approach" roads) and this segment survives today as Rowes Well Road.[3] The approach along the tracks from Williams continued to be used until replaced by the BPR-engineered south approach road from Williams in 1928-32.

One final road approached Grand Canyon from the National Old Trails Highway during the 1920s. Developed in 1919-20, the "Maine-Grand Canyon" road, or "Old Maine Road" as it was sometimes called even in its youth, ran north from the town of Maine (later named Parks) and around the east flank of Red Butte, then curved northwest to intersect with the Williams road near Rain Tanks.[4] From that point, traffic entered the park along the Rowes Well road or along the terminal portion of the Flagstaff-Grandview-Grand Canyon Road. Coconino County built the Old Maine Road for automobiles, though not to proper standards of the time, and maintained it (and no other) from 1920 through construction of the 1928-32 approach road from Williams.[5]

When the NPS assumed management responsibility of Grand Canyon National Park in 1919, Superintendent W.H. Peters noted that

> approach roads to the Grand Canyon National Park are a disgrace to the State of Arizona and Coconino County. While they can be called fair roads in this locality and among persons accustomed to desert travel, they seem almost impassible to the Californian and Eastern tourists. On account of these roads probably sixty percent of the transcontinental auto tourists do not come to the park.[6]

Peters knew well the problem. All approach/entrance roads, including that from Maine constructed the following year, were of dirt, sand, and bedrock with little or no subgrade. All were impassable when wet, deeply rutted following rainfall, prone to washouts from flash floods, and lacking drainage structures. Residents and tourism operators knew full well to stay at home for several days following rain, and to make their way along them hurriedly in the early morning during winter before the morning sun thawed a nicely frozen surface to mire. Local ranchers and homesteaders actually looked forward to winter showers, snowmelt, and summer thunderstorms for the economic boom afforded by pulling hapless tourist automobiles out of the muck with horse teams. The nearly 15,000 motoring visitors to south rim in the 1920-21 travel year dreaded the trip home along the same routes. Each year the number of mired automobiles and angry motorists grew.[7]

GCNP superintendents raised an annual protest to the NPS director over the condition of all roads in their vicinity during the 1920s. Regional and approach roads earned as much written abuse as park roads. They pointed out that in the 1925-26 travel year, more visitors arrived by auto than by train during several months and that for the entire season, 63,000 visitors arrived at south rim in some 20,000 automobiles. In 1926-27, numbers rose to 77,000 visitors in nearly 25,000 vehicles--the first year in which more people arrived at south rim in automobiles than by the Grand Canyon Railway. All understood the traffic trends, but not much could be done concerning a south approach and entrance road until funding appeared for the work.[8]

Funds for the construction of roads to and within the national parks began to loosen up in 1924-25. An agreement in 1924 (formalized in February 1925) between the NPS and BPR whereby the latter would design and manage construction of park-related roads also bode well for new park automotive roads. BPR engineers had also been working with the states since the turn of the century, and with modern state departments of transportation since the 1910s, thus, prospects looked hopeful for federal/state road projects. All favorable elements for the construction of automotive roads coalesced in 1924-25 when the BPR began surveys, specifications, and estimates for five road projects at Grand

Canyon, one of which detailed a new south entrance. An approach road leading to this entrance from Williams or Flagstaff would not be built until 1928-32, however, following the complex and politically sticky transfer of the county-owned Bright Angel Trail to the federal government in exchange for $100,000 in federal road funds.[9]

HISTORY OF THE STRUCTURE
1928 SOUTH ENTRANCE ROAD

Design and Construction

The first BPR-engineered south entrance road originated with the 1924 master plan for Grand Canyon Village. Beginning at the park boundary near today's Moqui Lodge, engineers designed the initial 3.85-mile segment to run almost due north through ponderosa forest well to the west of the Grandview entrance and east of Rowes Well Road. The final 1.96-mile segment curved northwest through alternating ponderosa and pinon-juniper forest to end in the heart of the expanding village at the 1921 NPS administrative office (superintendent's residence). The last 2,000 feet of this road would be redesigned in 1928 as a double road and ultimately become a portion of Village Loop Drive (see HAER AZ-41). The 1.6-mile segment which entered the village from the southeast would serve as a dividing line between Fred Harvey development to the west and NPS development to the east, and after 1954 become Center Road.[10]

As one of five road projects surveyed in 1925, and without immediate funds programmed for construction of all, development of the new entrance road proceeded slowly. The Bureau of Public Roads completed their survey in summer 1925. Still lacking funds to proceed, park forces cleared the roadway along the entire proposed route in the following year. In December 1926, engineers completed plans and specifications and administrators programmed funds for grading and surfacing. The BPR advertised for bids and USDI awarded the contract for grading as well as penetration macadam surfacing to James Vallandingham of Salt Lake City, Utah. The contractor started work in January 1927 and completed the project in December 1928.[11]

Vallandingham's workmen and NPS forces completed the South Entrance Road in three segments. They graded the initial 1.055-mile segment (2-B) from the south boundary northward, and the second 3.94-mile segment (2-A1 and 2-A2) to the junction of the village loop, both to a 24'-wide roadbed. Vallandingham then applied an 18'-wide penetration macadam surface to complete his portion of the work. The final segment running from today's

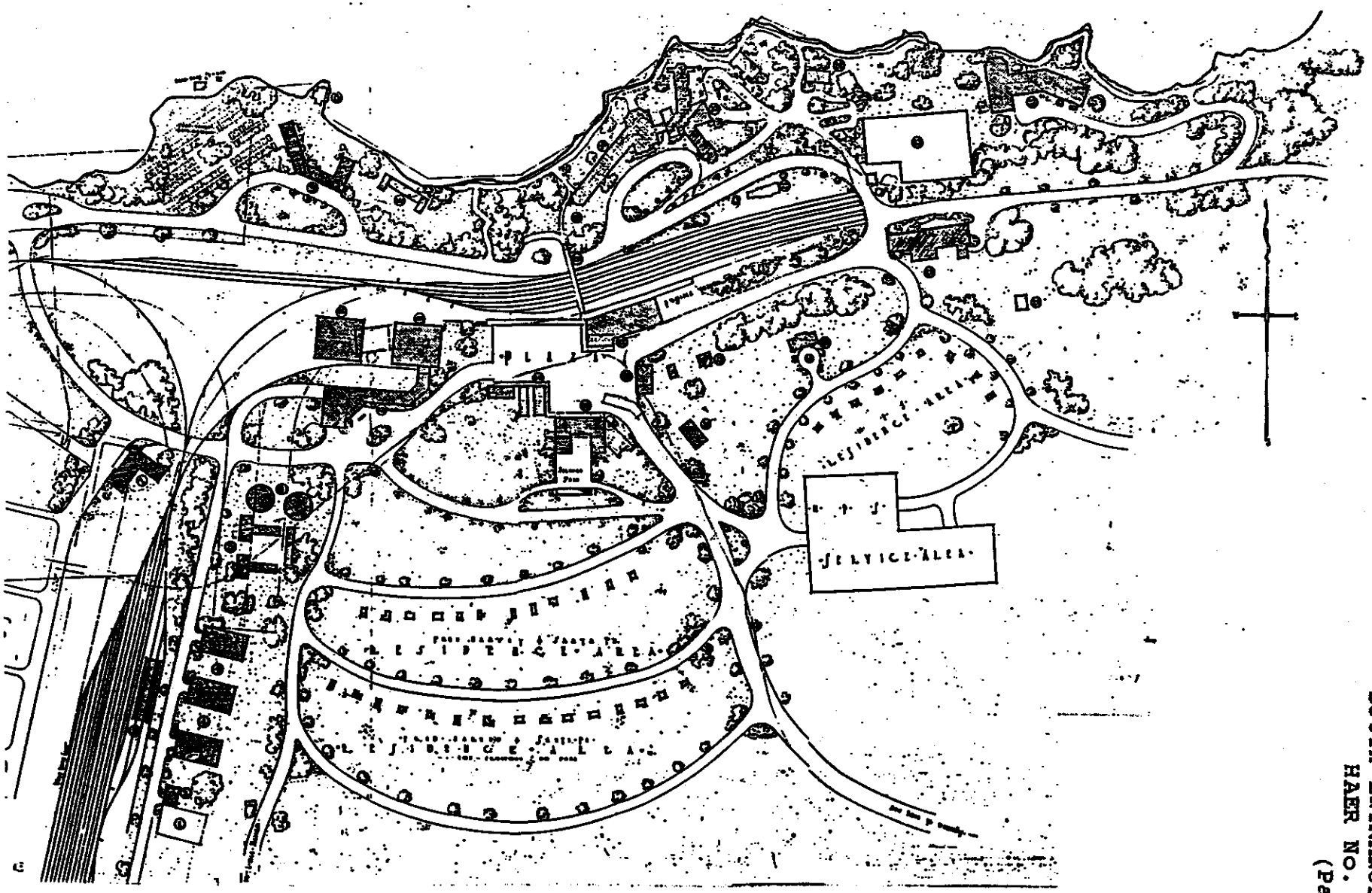

Figure 1. Design architect's conception of Grand Canyon Village, from the 1924 Master Plan. Note the plaza area and planned south entrance road. (GCNP, Professional Services)

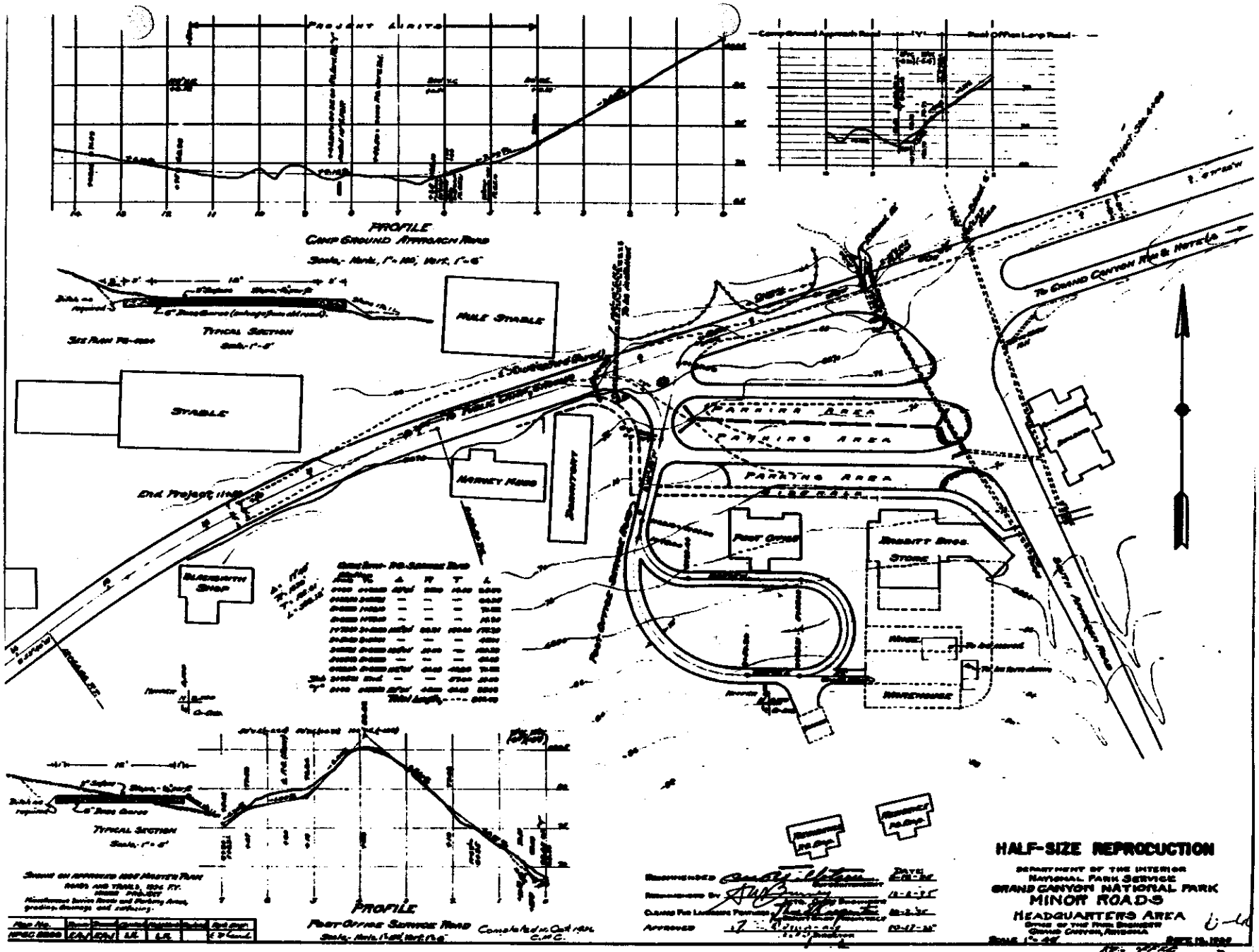

Figure 2. Park Engineer C.M. Carrel's sketch map of intersection of South Entrance Road and Village Loop, 1935-36. (GRCA #113/5066, Prof. Services)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

AS CONSTRUCTED PLANS FOR
PROJECT 2-A1 (POR.), B, D (POR.)
GRADING, BASE COURSE & BIT. TREAT.
ROUTE NO. 2 ~ SOUTH ENTRANCE
GRAND CANYON NATIONAL PARK
HIGHWAY SYSTEM
ARIZONA

INDEX MAP

SCALE OF MILES

LEGEND

* Denotes As Constructed Mileage

INDEX TO SHEETS	
Sheet No.	
1	Title Sheet - Grand Canyon Route 2
2	Title Sheet - So. Approach to Grand Canyon Village
3-4A	General Cross Sections
4	Estimate of Quantities
5-13	Plan & Profile - Sta 134+61 to Sta 489+23.36
14	Entrance Station
15	Metal Post Sections
16	Std. Fence & Gates (Wire)
17	Low Fence & Gates - Steel Posts
18	Special Project Sign
19	Std. Signs for Use on Construction

(Sheet 3A added making total of 20 sheets)

DESCRIPTION OF PROJECT:—
Project: Grand Canyon National Park Highway 2-A1 (Portion), B, D (Portion), Grading, Base Course and Bituminous Treatment.
Location: Junction of Park Route No. 1 to South Park Boundary, Sta 134+61 to Sta 391+77.
Length: approx. Miles * 4.494
Note: This project is combined with Project South Approach Grand Canyon National Park - A (Portion), Grading, Base Course and Bituminous Treatment (Combined length 4.494 Miles) * 4.805

PREPARED BY
U.S. DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

PROJECT 2-A1 (POR.), B, D (POR.)
GRADING, BASE CRSE. & BIT. TR.

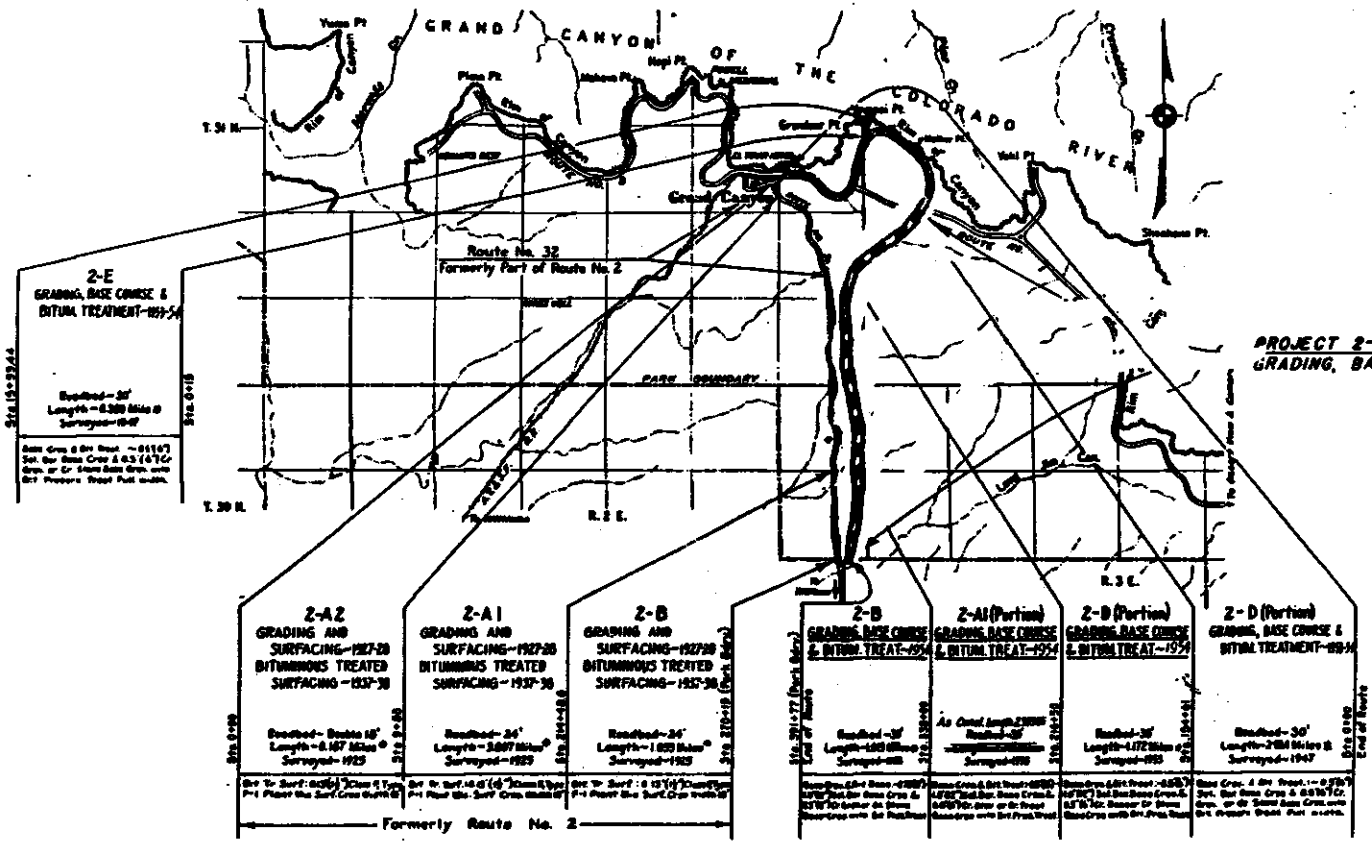

Figure 3. Map of south rim roads in 1953. The South Entrance Road on the right will replace the South Entrance Road on the left in 1954. (GRCA #113/60206A, Professional Services)

Ranger Ops building to the old superintendents' residence was, as mentioned earlier, redesigned and graded by park forces then surfaced by Vallandingham in October 1928.[12]

Construction of the south entrance road included an entrance arch at the park boundary and an entrance station where the road approached Grand Canyon Village. The entrance arch spanned the entire roadway and consisted of two masonry pillars of rough-quarried stone (typical of early 1910s-1930s rustic style) tapering near the top. A peeled ponderosa pine log pierced the stone pillars near the top and spanned the 18' wide roadway at a height of approximately twenty feet. Visitors passing beneath the arch were greeted with a rough-hewn wooden sign dangling by chains from the overhead log which read "Grand Canyon National Park" in capital letters, carved into the wood and highlighted with white paint.[13] This arch was dismantled some time after abandonment of the old alignment in the middle 1950s.

The south entrance station completed by 1930 stood in the middle of today's Center Road on a curve, about fifty yards southeast of the 1939 service station (today's school bus building) between Boulder and Albright streets. The peeled-log building rose from the center of a masonry-curbed traffic island, landscaped with native grass and shrubs. The lovely rustic building, reminiscent of today's North Entrance Station, was destroyed in 1951 by a tourist's runaway automobile and replaced by a cheap Mission 66-style frame and glass station. The new building was placed along the roadway rather than on the traffic island, and the assumption is that park forces removed the island from the center of the road. Givens Construction Company, contractor for the modern entrance road, moved this structure in one piece in September 1954 to become a part of the entrance station along the new road.[14]

Major Repairs and Alterations

The Center Road segment of the old south entrance road has retained its original alignment since completion in 1928, but roadside features and landscape have changed considerably since that year. Valandingham built the road through virgin ponderosa pine and pinon-juniper forests where no road had gone before, but the terminal portion at the village soon began to change.

The 1924 master plan called for survey and grading of Avenues A, B, and C--minor roads that would serve the Fred Harvey Company's residential district east of the south entrance road. The company surveyed these minor roads and residences in early 1926, beginning with 22 residences along Avenue A (today's Apache Street), which was described at the time as a "by-road which

meandered in and out among the trees, narrow, and in Fall, Winter and Spring, impassible to all traffic." Park forces cleared and rough-graded Avenue A in 1927, including its intersection with the entrance road, and further improved it in 1931 along with the survey, clearing, and grading of other intersecting streets--Avenue B (today's Boulder Street) and Avenue C (no longer connected to Center Road).[15]

The entire entrance road as well as intersecting village service roads received considerable improvements during the period of park public works projects, especially in the years 1933-37. Soon after Civilian Conservation Corps Company 819 arrived at the park in May 1933, they established Camp NP-2-A south of Avenue A and west of the Fred Harvey residential area and went to work on park roads. Superintendent Tillotson approved seventeen initial projects for Company 819, including roadside improvement to the entire south entrance road and intersecting minor roads. Landscape architect A.C. Kuehl kept about fifty young men busy for several enlistment periods along the entrance road on tasks such as slope cutting, ditch clearing, revegetation, widening shoulders, sealing cracks, patching oil-mixed surfacing, and building culvert headwalls (see HAER No. AZ-35 and associated reports).[16]

In 1937-38, the south entrance road, initially constructed with a macadam surface, received its first bituminous-treated (asphalt) surfacing. Nearly ten years of use had apparently broken down the wearing tread such that Superintendent Tillotson described it as corrugated and "wavy." Contractor Jack Casson applied two overlays to the entire length of 18'-wide roadway: a leveling course, and a 1-1/2", Class F, Type F-1 plant mix wearing course. He completed the project in August 1938.[17]

In 1939, the Santa Fe constructed a modern eight-pump service station along the south entrance road, about 50 yards northwest of the entrance station. The new station was built in response to the inadequacy of the one (gravity) pump at the end of the railroad tracks in front of the Fred Harvey garage, as well as traffic problems caused at that location by autos and buses lining up to fill. The new masonry building, which today serves as a repair facility and parking area for school buses, once included a projecting flat roof with peeled-log pillars. This "awning" protected vehicles from the elements as they drove in to the two pull-through lanes of four pumps each. It extended out to the roadway in front of the southeast end of the building.[18]

During World War II, visitation to the park as well as appropriations returned to early 1920s levels, thus, little work other than minimal routine maintenance was directed to roads, including the south entrance road. As the war wound down in

1945, and in 1946, NPS administrators anticipated the explosion of visitation which would ensue and began to make plans for a new south entrance road which would bypass the village. With these plans in mind, only routine maintenance continued through the 1940s and into the early 1950s.[19]

With construction of the new south entrance road in 1953-54, the purpose of the old road changed entirely. No longer the primary automotive access to south rim, it became a service road for NPS and Fred Harvey village employees. Its name, too, was changed from Route 2, South Entrance Road to Route 32, Grand Canyon Village Commercial Access Road. After 1954, it also acquired the name of Center Road, which is what one sees on the street signs today and what everyone associated with the park calls it.[20]

Immediate changes for the old road in 1954 included obliteration of its first 3.75 miles (Sections 2B and most of 2-A1) and reconfiguration of the eastern end of the road to form a "T" intersection with the new South Entrance Road. For reasons not entirely understood, but probably to accommodate heavier vehicles and traffic volume, the BPR and NPS decided on an entirely new alignment from the south boundary which would run nearly due north and parallel the old road for almost four miles, only 50 to 200 yards to the east. Park forces obliterated the old alignment, removing surface and subgrade while grading the topography to something approaching a natural appearance. In December 1954, a ranger-led crew of boy scouts planted pinon pine seeds along the road scar. Thirty years later, this segment--which serves as a utility corridor--is easily traced (once found) by following a dirt road along and through the absent-tree line from Shuttle Bus Road to the Moqui Lodge. Some of the scouts' efforts have borne fruit, and by the looks of it, the tree line may be back to a natural condition within a century.[21]

Development continued along Center Road after it was bypassed in 1954, but the road itself changed little until the widening and surfacing project initiated in early 1994. NPS forces continued with normal maintenance which included chip seal and surfacing, crack filling, patching, and ditch clearing. Intersections with minor roads such as at Apache Street in 1984 were reconstructed and curbed, but roadway alignment (1928), width (1928), and culvert headwalls (1933-37) remained as constructed until this year. Alignment is to remain the same within this project, but pullouts are being constructed on the east and west sides of the roadway just south of Ranger Ops, masonry curbing is being laid on both sides of the roadway as far south as Apache and Tonto streets, a bicycle path is being built that crosses the road at Boulder Street, and nearly all historic CCC culvert headwalls are being replaced with modern masonry headwalls (see HAER No. AZ-35 and associated reports).[22]

Figure 4. Vallandingham workers at the quarry near the town of Tusayan, 1927-28 South Entrance Road Construction. (Final construction report, GCSC)

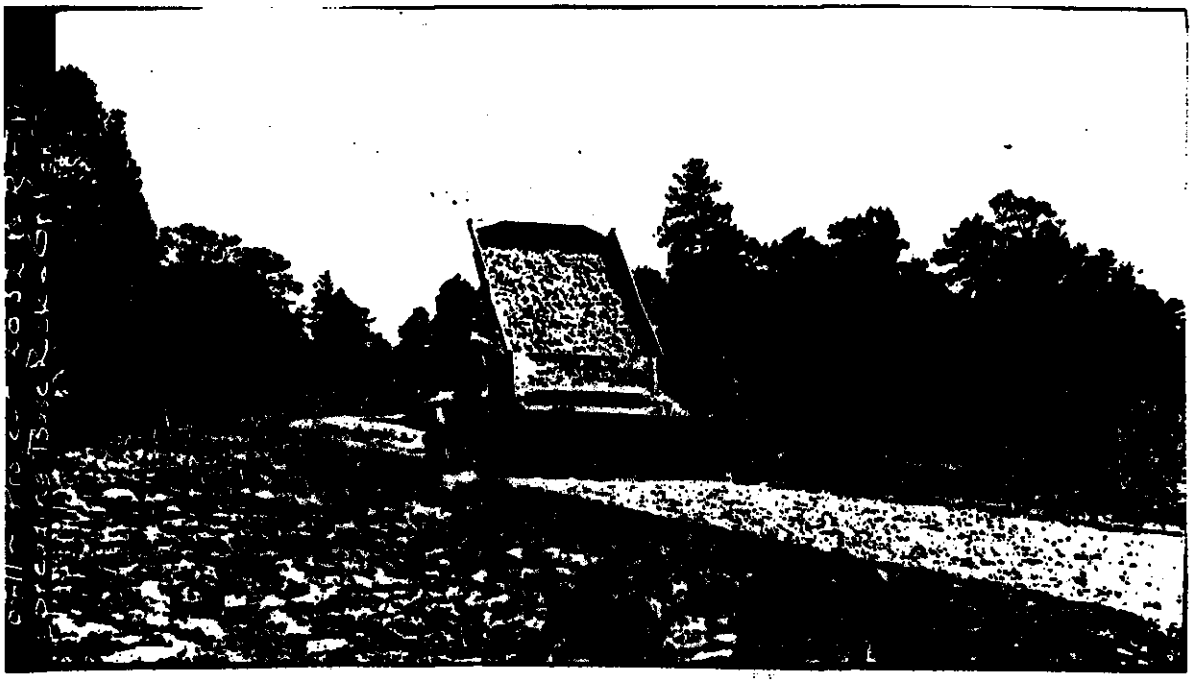

Figure 5. Vallandingham workers subgrading (above) and surfacing (below) during 1927-28 South Entrance Road Construction. (Final Construction Report, GCSC)

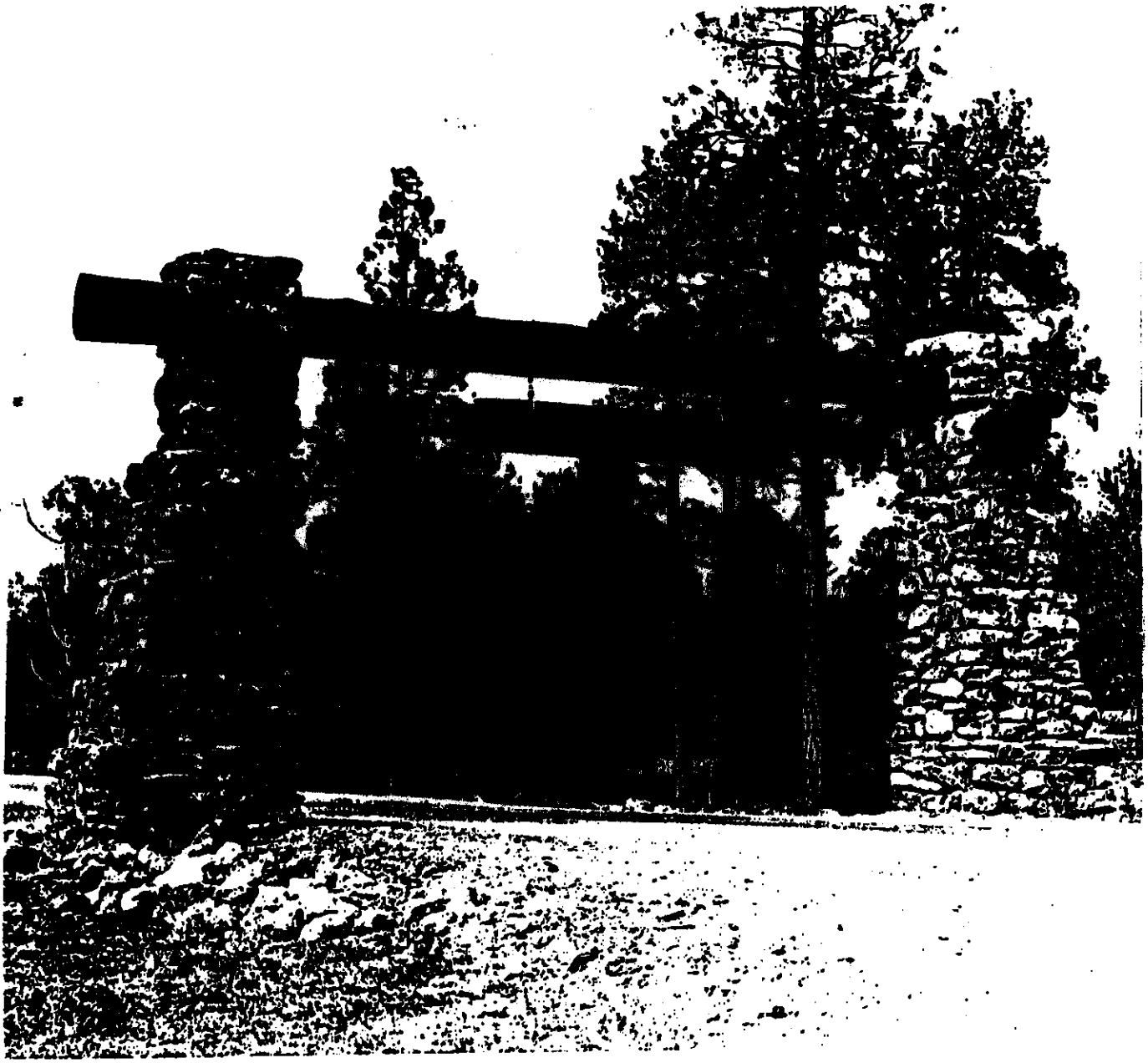

Figure 6. Entrance Arch, 1928 South Entrance Road, November 1931. (GRCA Image #140, GCSC)

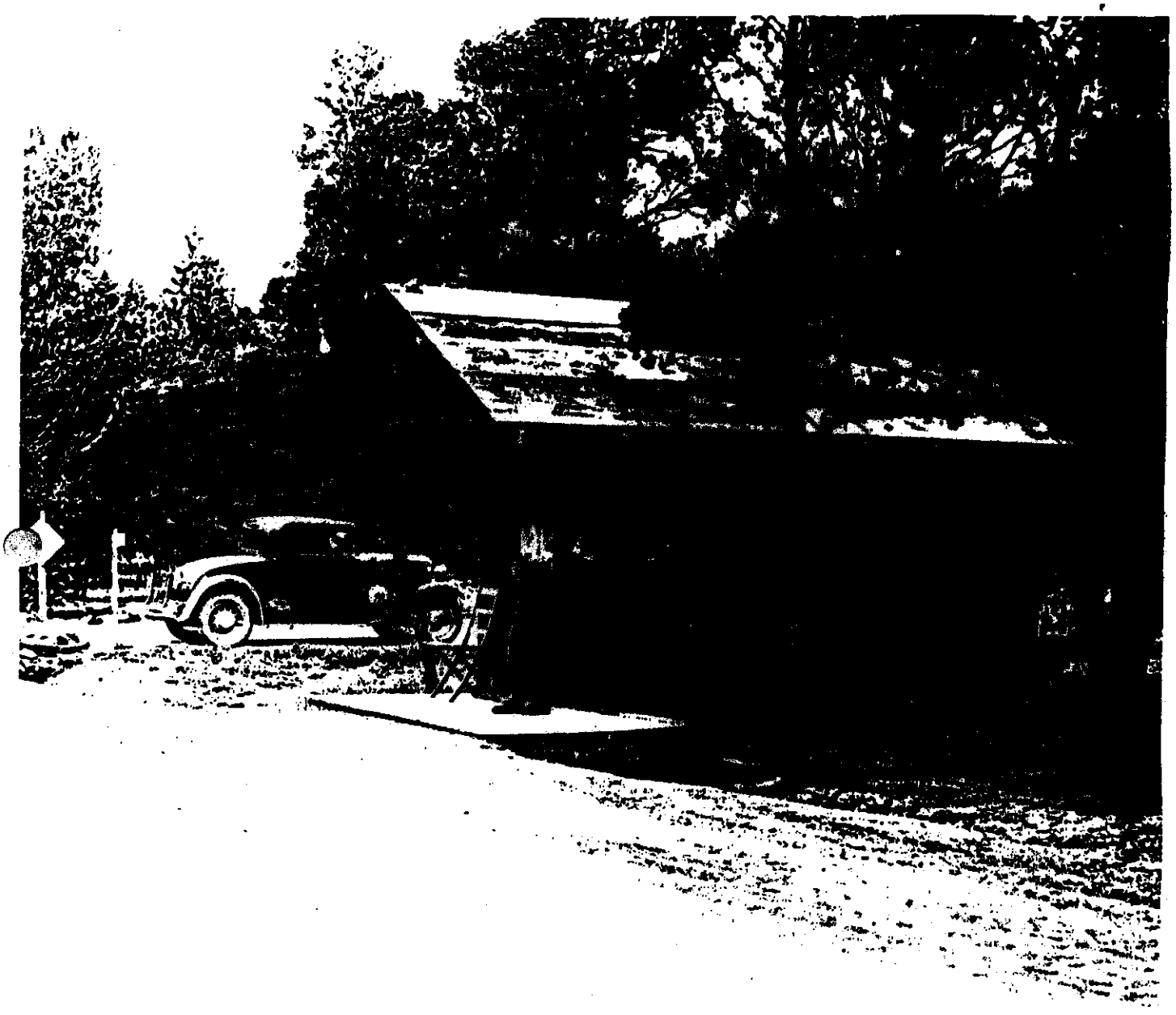

Figure 7. "Old South Entrance Station was located on Highway 64 at junction with service road 300 yards south of Administration Building," August 1930. This station apparently predates the log entrance station at about the same location. (GRCA Image #4, GCSC)

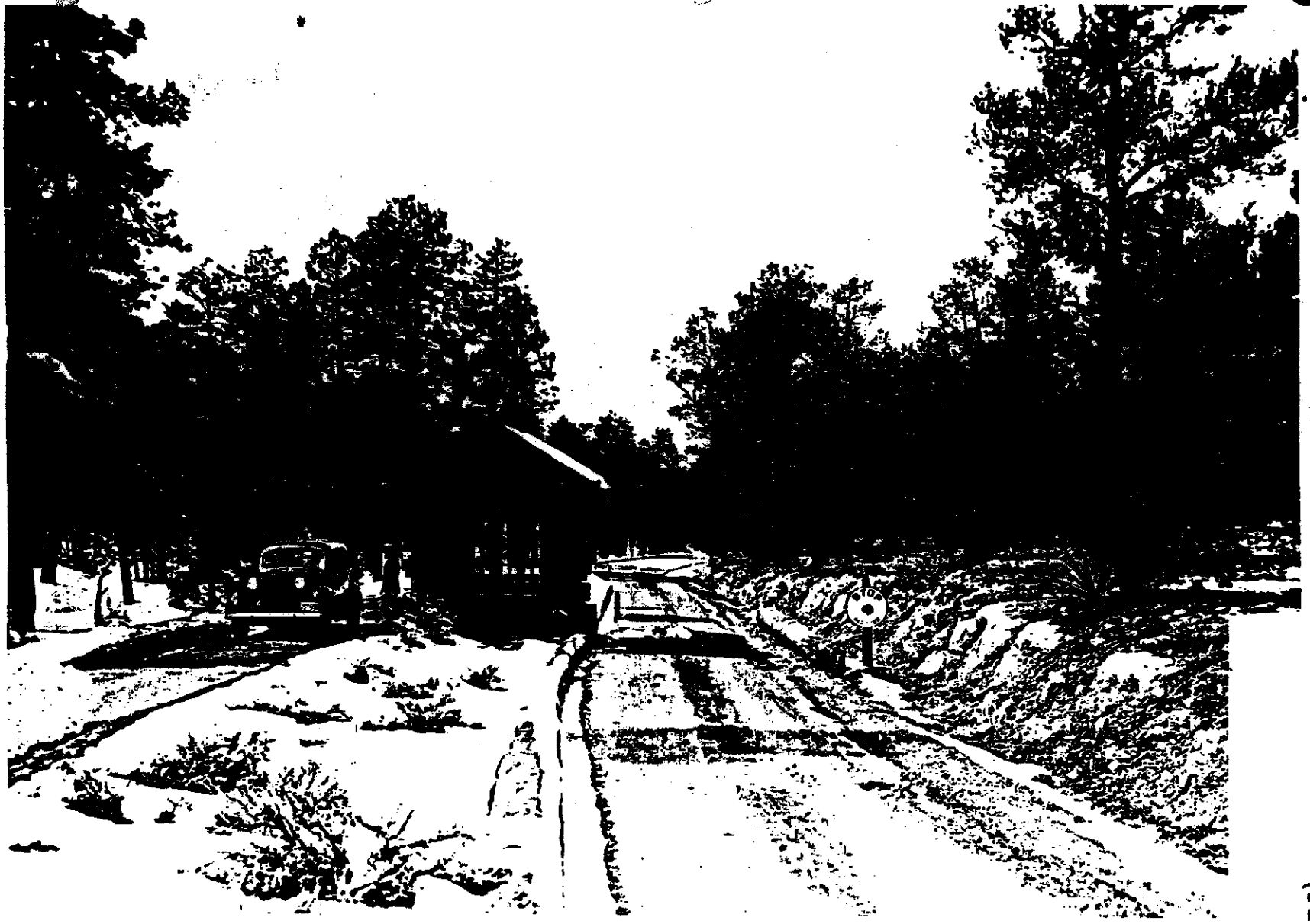

Figure 8. South Entrance Station between Boulder and Albright streets in 1938. This log structure was in place by 1930-31. It was destroyed by a runaway automobile in 1951 and replaced with a small modern structure. (GRCA Image #7991, GCSC)

Figure 9. CCC crews rounding slopes along the South Entrance Road, 1937. (GRCA Image #285, GCSC)

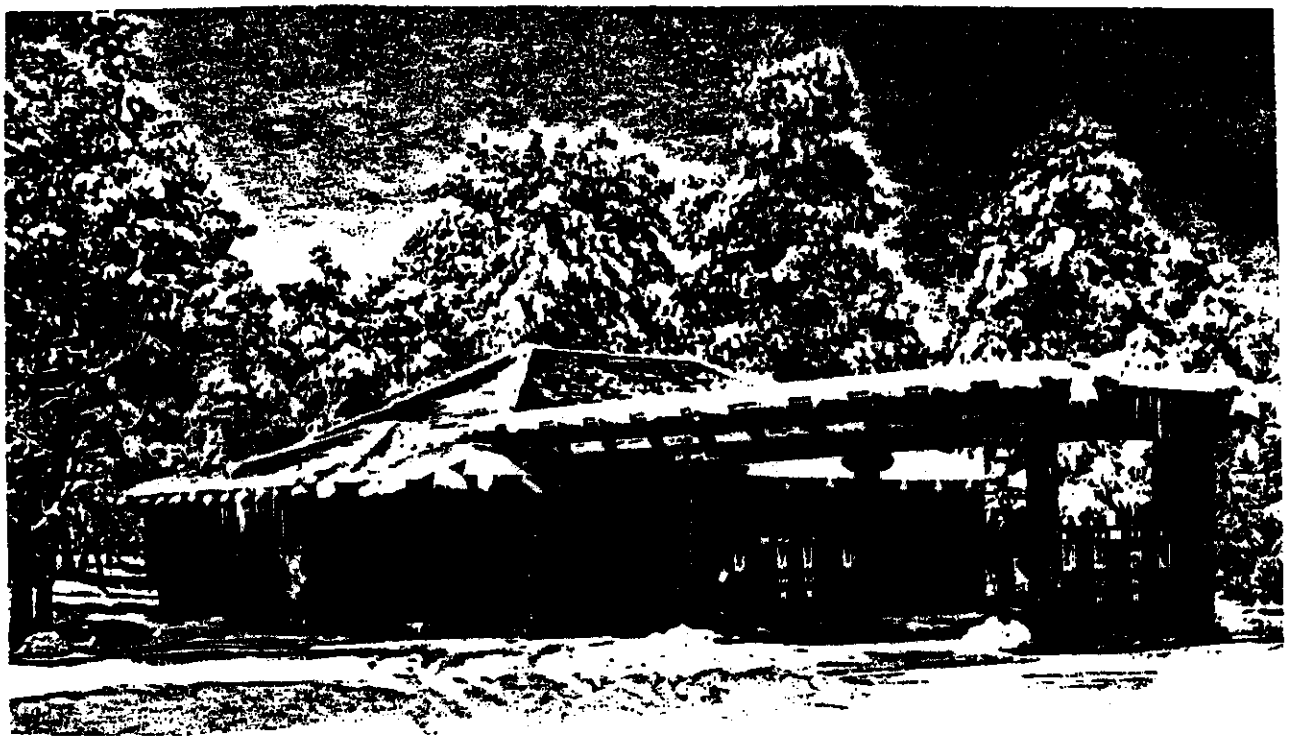

Figure 10. Fred Harvey service station on South Entrance Road in 1950. Built in 1939. (GRCA Image #13950, GCSC)

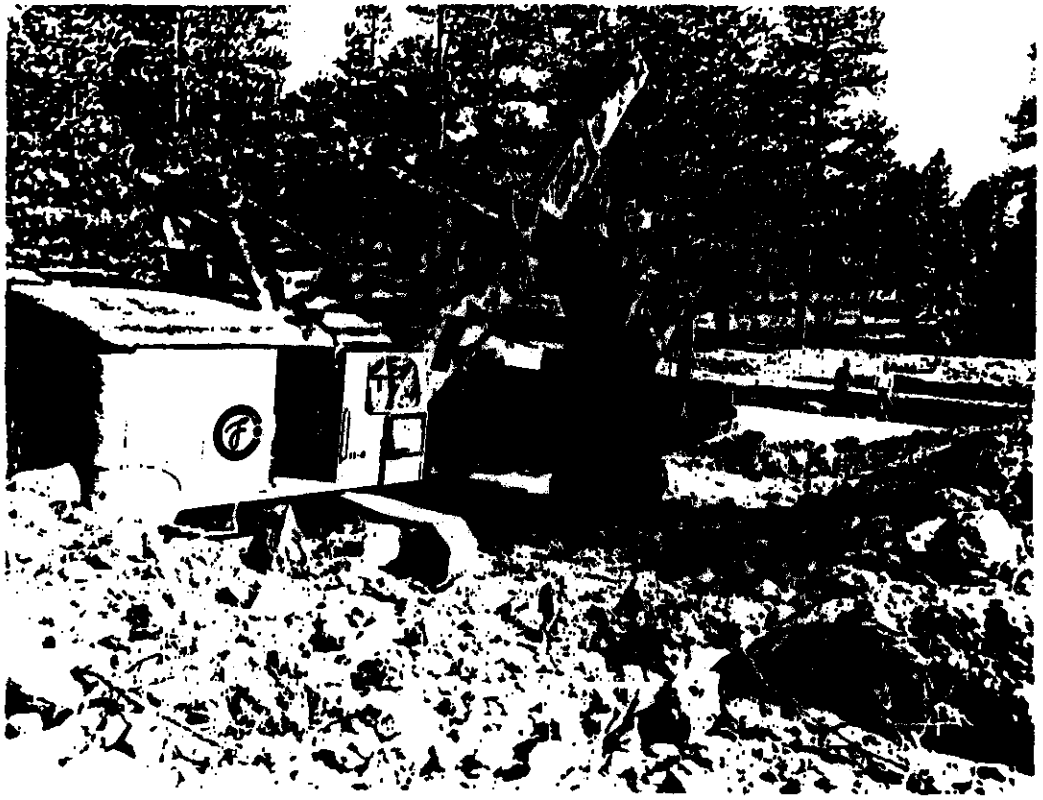

Figure 11. Fisher Contracting Company shovel and 12-yard dump truck working on the first segment of the new South Entrance Road near Yavapai Point, July 1953. (GRCA Image #2585, GCSC)

Description

The intersection of Center Road and Village Loop Drive had been planned since the 1910s as a civic plaza within a village which was to evolve along the City Beautiful movement, popular at the turn of the century. The 1924 NPS master plan confirmed this intention, but the "plaza" has never developed in quite the manner envisioned. As if illustrating the confusion of plan versus traffic realities at GCNP, the intersection has in fact endured more changes over the years than any other roadway within the park.

When Vallandingham completed the Center Road segment of South Entrance Road in 1928, at least one building in place reflected the civic plaza concept--the Babbitts' store, along the northwest corner of Center Road. By 1932, however, planners had begun to discard the open plaza concept with construction of a large landscaped traffic island curbed with stones immediately north of the building.[23] This allowed two lanes of traffic to pass (perhaps one lane to park) in front of the store while vehicles continued along Center Road on the east and Village Loop on the south. This intersection was more severely constricted in 1935-36 when a formal parking area three lanes deep was constructed to the north serving both the store and the newer post office to the west.[24] Needs for village parking had fairly well superseded thoughts of scenic plazas by the middle 1930s.

The nearby built landscape continued to change as the new administration building was completed along the northeast corner of the intersection (1929) and the Babbitt Brothers added several warehouses south of their store. The landscape appeared not to change all that much, however, at least through the 1930s, as all buildings were of rustic architecture, roadways mimicked the surrounding terrain with gravel then macadam surfacing, and great care was taken to preserve the natural vegetation. Photographs through the 1930s reflect a rustic setting down to the hand-lettered, wooden directional road signs. Fewer vehicles required little or no warning signs, which helped preserve the natural setting. The uncluttered look appeared a primary goal for the intersection and initial few hundred feet of Center Road, and with hordes of public works men raking pine needles, rounding slopes, and planting trees, shrubs, and grass, the look was not hard to achieve.[25]

The roadside and adjacent landscape from the Village Loop intersection to the south and southeast as far as the south boundary also exhibited in the 1930s and likely through the 1940s a more natural appearance than today. Fewer intersecting roads and fewer vehicles alone would account for this, but teams of CCC men raking, planting, and rounding ditches and shoulders through

the developed area and beyond assured this primary NPS goal. Aside from undergrowth, however, which is thicker today than decades ago, the natural landscape remains much as it was sixty years ago. The canopy of ponderosa pines surrounding the Village Loop intersection and thick stands of pinon and juniper farther to the southeast have survived. Many young ponderosas seen in 1930s photographs can be recognized in their middle age along the road today.[26]

It is unfair, and a bit difficult, to compare today's roadway to that of the 1930s since Center Road from the intersection with Village Loop as far as Clinic Road is torn up with construction. Surfacing has been stripped from the road itself and traffic, which never seems to abate, splashes through the muck in the wake of water trucks wetting down the dust. The parking area in front of Babbitts is also torn up while the historic store itself is gone--burned in an electrical fire in winter 1994, the blackened timbers and upright masonry columns only recently (July) cleared and site cleaned. Once again, the ever-evolving intersection is undergoing reconfiguration and one cannot tell at this time exactly what it will look like in 1995.[27]

Despite the uncertain nature of the Center Road/Village Loop intersection, one can ascertain the present intent for Center Road itself. The alignment which dates to 1928 is not changing, but the roadway from the intersection to Apache and Tonto streets is being converted into an "urban" street of masonry curbing and curb to curb surfacing. Road crews are also resurfacing the remainder of Center Road, at least through the developed area which currently extends to the clinic road and Lapp Loop. Road widening is not a goal of the current project, but it appears that widening is taking place as 1930s CCC culvert headwalls and some of the CMP culverts are being replaced along this length.

Beginning at the intersection with Village Loop, the first features worthy of note are the sweeping roadway aprons which ease the flow of traffic between the two roads. Aprons give the intersection a broad appearance and they date to the late 1920s construction when ideas for a roomy plaza still occupied planners' minds. Along the south-southeast side of Center, a 4'-wide asphalt walk with placed stone (not cemented) curbing abuts the street and continues along the front of the former 1929 administration building. This walk and curbing are attributed to the CCC, but no specific reference to their construction has been found.

At the intersection with Tonto (on the east) and Apache (on the west), three CCC culvert headwalls of the 1933-37 period have been removed and replaced with new masonry headwalls on the NW, SE, and SW corners. These walls are nicely constructed of rough-

cut, irregularly-shaped stones and beautiful mortar pointing, and mimic the walls they replace to a great extent.[28] Principal differences lie in the rock itself and how it is cut. CCC walls are of a rougher cut, often limestone; modern NPS walls are of a sharper cut, often sandstone. A new culvert headwall on the east side of Center just south of the Ranger Ops building measures 7' long x 3.5' high x 2' wide. The new headwall on the SW corner of Apache measures 7'4" long x 3' high x 2' deep. The size and appearance of these two walls are typical of most being built within the 1994 project.

Center Road's surfaced roadway measures twenty feet across just south of its intersection with Apache. This width is consistent with some of the early construction reports which identify a 20' macadam surface; it is two feet wider than other reports which identify an 18' macadam then bituminous-treated asphalt surface. In any event, it suggests that the roadway has not been widened much, if at all, since 1928 construction, and identifies roadway width prior to the 1994 project.

Unlined ditches parallel Center Road and drain to the northwest toward Village Loop. These ditches continue from Apache beyond Albright Street as the road ascends in a moderate grade. The main ditch is on the southwest side of Center and the slope ensures that all culverts under Center (at least to Albright and perhaps beyond) drain from the northeast to the southwest. Each intersecting road (Tonto, Apache, Boulder, Albright, and Clinic) requires culverts and all as far as Clinic road had CCC headwalls in 1993. These have all been replaced as described above or are about to be replaced within the 1994 project.

At the intersection of Center and Boulder, a 1994 9'-wide bicycle path crosses Center and continues down to the east side of the Ranger Ops building and across Village Loop to the footbridge over the wash and on to the RR depot area. The path also requires culverts and headwalls, which measure 5.5' long x 3'3" high x 2' wide. Beyond Boulder Street and as far as Clinic Road there are several culverts which pass under Center Street which have new headwalls in place.

There are no intersections nor masonry walls beyond Clinic as Center Road passes along minor cuts and fills to its intersection with Shuttle Bus Road. At this point the old entrance curved sharply to the south along the initial Shuttle Bus alignment for its run to the park's south boundary. Today, Shuttle Bus leads back to the NPS helicopter field and shuttle bus repair station, but the first couple hundred yards (until it turns again sharply toward the helicopter field) is the old entrance road. At the curve, an earthen berm directly south blocks the path of the old alignment, but one can drive around this obstacle and remain on a

dirt road along and near the old road as far as the Moqui Lodge. This modern dirt road ends just short of the lodge and offers no exit to today's approach road visible immediately on the east.

The segment of Center Road from Shuttle Bus to the intersection with today's south entrance road dates to the 1953-54 project and its purpose is obvious. This short segment allows NPS and Fred Harvey employees, service vehicles, delivery vans, buses, and knowing tourists to cut several miles from their journey to Grand Canyon Village. There is only one sign along the entrance road at this intersection, which states that the clinic lies down the road to the northwest. There are no directional signs (but a few warning and informational signs) other than intersecting street signs along Center Road.

HISTORY OF THE STRUCTURE
1954 SOUTH ENTRANCE ROAD

Design and Construction

As noted earlier, NPS planners as early as 1945-46 envisioned a new south entrance road which would approach Grand Canyon Village from the east and entirely bypass the Center Road segment of the old entrance. Superintendent Bryant's stated reason for the new road was to avoid "the present confusion of roads in the village and reach the rim of the Canyon more easily."[29] This statement, however, rings false or at least incomplete, as all services in 1946 remained at the village nucleus and tourists would end up at that point whether they approached directly or indirectly.

It is far more likely as indicated in other correspondence that Bryant, NPS planners, and BPR engineers realized that tourists would return in droves following the end of World War II and that existing roads would have a difficult time withstanding the weight and volume of modern vehicles. GCNP administrators likely wanted to keep such traffic from passing through the heart of the NPS and Fred Harvey residential areas as well, and may already have envisioned village development to the east which would be better served from that direction. In any event, several years had to pass before Congress would awake from the war years to understand the citizenry's frenzied return to the national parks along antiquated roads.

Early conceptions of a new entrance road did not follow exactly along the alignment seen today. In February 1947, the regional office of the Division of Plans and Design completed a drawing which depicted use of the old entrance road as far as today's Center Road intersection (with two minor straightening segments), then a broad loop to the northeast and west as eventually

constructed. This plan called for improvements at Mather and Yavapai points, but envisioned nothing new in the area of today's visitor center. The intent seemed to be that expressed by Bryant the year before--to get tourists to the rim quicker--as well as to relieve congestion within the residential area.[30] Plans a few years later did not reflect the broad loop at the end, but rather something of a "T" intersection with East Rim Drive in the area of Mather Point.[31]

The Bureau of Public Roads apparently completed a reconnaissance, survey, and specifications for the new south entrance road by 1952 because the BPR opened bids for construction on June 3rd of that year. Only one contractor submitted a bid, and the Department of Interior rejected it as being too far in excess of engineers' estimates. Nothing more of this attempted project was found in the course of this study, but based on knowledge of other aborted park road projects, the BPR probably went back to the drawing board to redo plans and specifications. The new south entrance finally advanced beyond the planning stages in 1953 when the BPR designed a two-stage construction project and solicited bids. USDI awarded the first contract to the Fisher Contracting Company.[32]

Fisher completed the first segment (a portion of section 2-D) of the new entrance road in 1953-54, which ran from Grand Canyon Village (Station 0+00) to a point (Station 154+61) south of today's intersection with East Rim Drive. The project--which followed the survey of 1947--resulted in grading, base course, and bituminous treatment of a 30'-wide, 2.924 mile roadway. Base course consisted of 0'-6" of selected borrow and 0'-6" of crushed stone. This segment began at Village Loop Drive and traversed undeveloped country south of the pioneer cemetery, then looped north past the Yavapai Point spur and Mather Point before turning south where it flowed smoothly into East Rim Drive along an old alignment. The new road obviated a segment of East Rim which ran from the point several hundred feet south of today's intersection with the entrance road, directly west to a point near today's visitor center. Upon completion, NPS administrators began to consider this roadway an official portion of the south entrance road rather than the initial segment of East Rim Drive which it superseded.[33]

Construction of the remainder of the new south entrance road followed close on the heels of the first project. The BPR opened bids on 2 February 1954 and the Department of Interior awarded the contract to Givens Construction Company of Phoenix, Arizona. The contractor started work on 16 March 1954 and completed the project 8 November 1954. Construction costs totalled $265,936.00, or $55,116.00 per mile for the 4.825-mile segment, which extended from Station 154+61 near the junction of East Rim Drive to 409+25

south of the park boundary to merge with the recently-rebuilt Arizona Forest Highway 2 (State Route 64). Upon completion, the entire entrance road within the park from Village Loop Drive to the park boundary (Sections 2-B, 2-A1, and 2-D) measured 7.418 miles with a maximum grade of 6.1 percent and minimum radius curves of 3400' (blind) and 5000' (open).[34]

This contract called for 4.825 miles of grading, base course, and bituminous treatment of a 30'-wide roadway--the same as the first segment completed earlier in the year. The base course consisted of selected borrow ranging from 0'-6" to 0'-12" in depth, placed and compacted in layers not exceeding 0'-6", and topped by 0'-6" of crushed stone placed and compacted in 0'-3" layers. RC-3 asphaltic oil was applied to the base course at an average rate of 0.71 gallons per square yard, resulting in 1" of bituminous penetration. A second application of RC-4 at an average rate of 0.44 gallons per square yard followed the first. This treated surface was covered with "Type 4 blotter material" of crushed red cinders at an average rate of 20.58 pounds per square yard. The contractor delivered and stockpiled another 100 tons of colored cinders for future chip-sealing, presumably to maintain the red surface appearance. Drainage structures consisted solely of 1424' of corrugated metal pipe culverts with end sections (no headwalls) which ranged from 18" to 36" in diameter.

Landscape requirements within the contract included 59,000 cubic yards of excavation for slope rounding and 4,780 cubic yards of topsoil for revegetation. Aside from the contract, NPS forces obliterated 3.4 miles of the 1928 entrance road from the park boundary to Center Road, first stripping and stockpiling the old bituminous mat then blading the ground to original contours. A troop of boy scouts, as noted earlier, seeded pinon pines along the old alignment later in the year. Other old roads obliterated by force account included segments of the 1913 automotive road mentioned at the beginning of this report, and several other old roads in the vicinity of the Center Road intersection. The BPR accepted the national park segment of the roadway on 8 November 1954 while the state accepted the small portion south of the park boundary on 6 January 1955.

With the obliteration of 3.4 miles of the 1928 entrance road, the remaining portion (Center Road) was extended 1200 feet to the east to join with the new entrance road at Station 216+50. This generally followed the alignment of an older spur road which had connected the 1928 entrance road with the 1913 entrance road.[35]

A new entrance station necessarily accompanied a new South Entrance Road. Construction drawings depict the station complex at approximately Station 217+80 through 219+20, but a final completion report identifies its construction in 1957-58.[36]

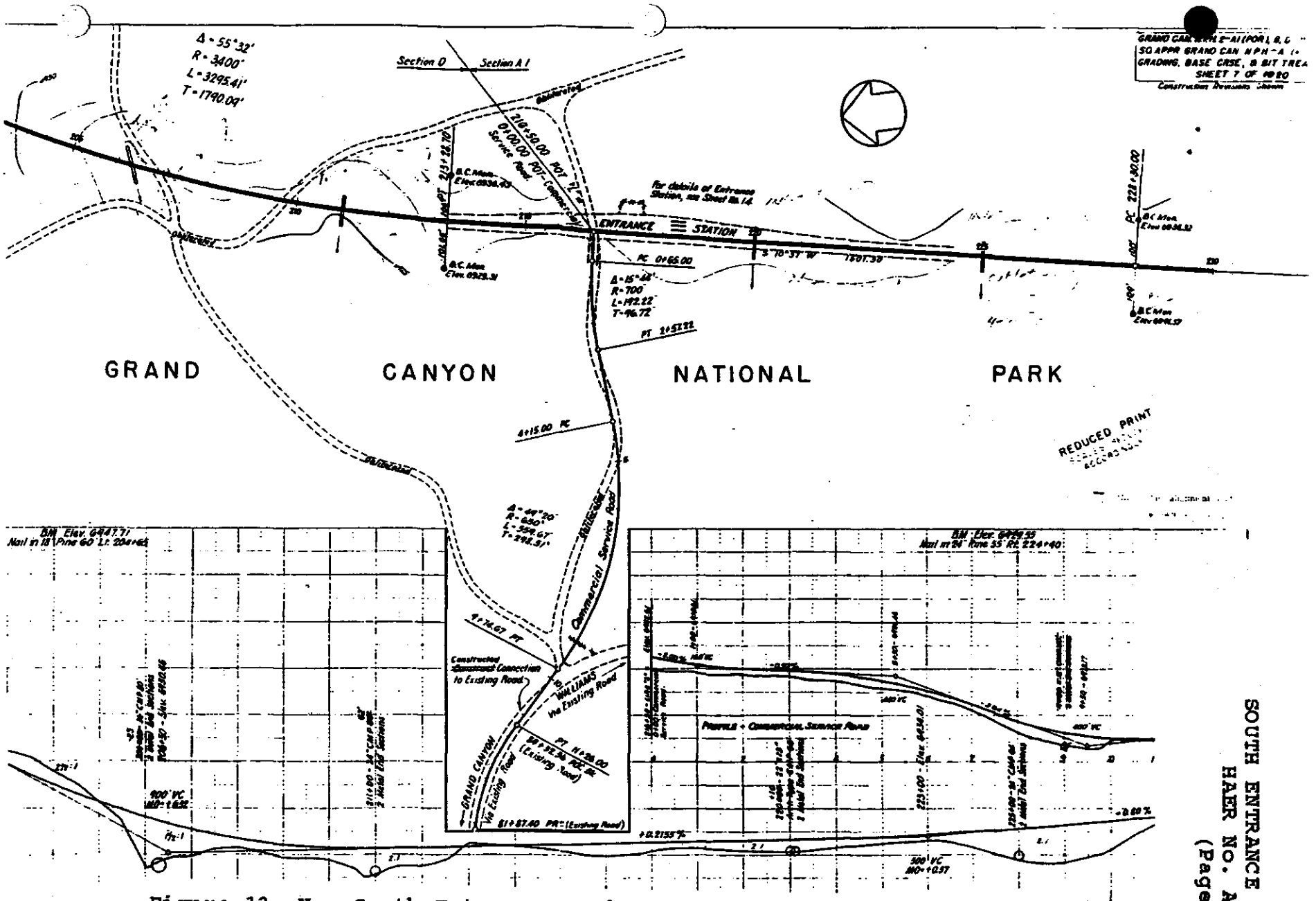

Figure 12. New South Entrance Road at today's intersection with Center Road, 1954. Note the new entrance station location, old roads obliterated, and extension of Center Road. (From As Constructed Drawings, Sheet 7 of 20)

SOUTH ENTRANCE ROAD
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Figure 13. Segment of new South Entrance Road at site of new entrance station, September 1954. (GRCA Image #3190, GCSC)

Figure 14. New South Entrance Station, 15 July 1963, facing south (GRCA Image #4275, GCSC)

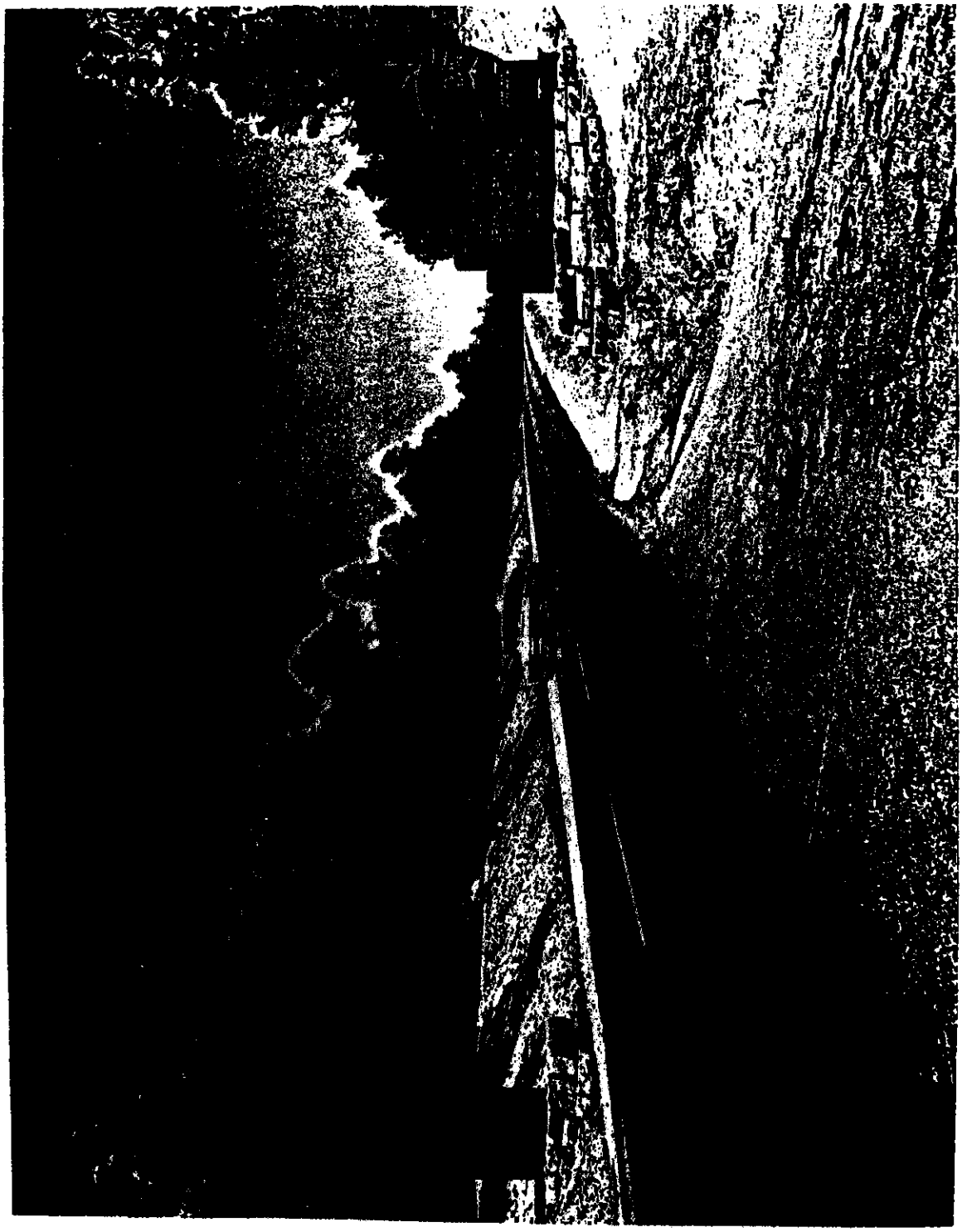

Figure 15. New "entrance portal" with entrance sign, 9 June 1959.
(GRCA Image #3489, GCSC)

Figure 16. Boy scouts planting pinon pine seeds in the obliterated portion of the old south entrance road, December 1954 (GRCA Image #2699, GCSC)

Figure 17. Aerial view of the new (present) south entrance station, July 1989. (GRCA Image #16497, GCSC)

Givens Construction moved the existing station from Center Road to its new location in September 1954, and this apparently served until the more formal station was completed. D.O. Norton and Sons of Phoenix, Arizona, won the contract to construct two frame buildings--Building No. 310-A measuring 8'-0" x 20'-0" (checking station with toilet facility) and Building No. 310-B measuring 4'-4" x 7'-0" (a checking station). The project included excavation, concrete footings and stems, a concrete slab on grade, electric, plumbing, painting, toilet accessories, septic tank, and bumper sign guards. NPS rangers began to use the buildings in December 1957, but the project was not completed until September 1958. Contractor was paid $16,211.34 for his efforts.[37]

D.O. Norton's contract included a narrow island extending approximately forty feet to the south and ten feet to the north of the 8' x 20' entrance building. A post and single-beam guardrail surrounded the island. Traffic entering the park passed in two lanes along the east of each building, with room for another lane of traffic to pass farther to the east. Only one exit lane ran along the west side of the larger building. Construction photographs indicate that the smaller building was removed and placed "in storage" as soon as the larger was completed, but a 1963 photograph shows the same building or an exact replica back in place serving two lanes of visitors.[38]

Completion of the new South Entrance Road also called for construction of an "entrance portal" at Station 388+00 consisting of signs and pullouts on both sides of the road.[39] Each sign was of peeled logs mortared upright in a three-tier, roughly 2'-high, masonry foundation, fronted by a wooden plank sign and an adjacent standard NPS "arrowhead" sign. The entrance sign (erected in 1956-57) read "South Entrance, Grand Canyon National Park, National Park Service, Department of the Interior," and was constructed by the Yosemite National Park sign shop at a cost of $378.00 Pullouts were gravel surfaced, 30' deep and 50' long, and across from each other between Stations 389+50 and 390+00.[40]

Major Repairs and Alterations

Following the first winter after the new South Entrance Road was constructed park administrators noted that the surface was deteriorating rapidly. Engineers quickly determined that this was due to the thin bituminous-treated surface which had not been treated with a final seal coat. Administrators also noted that channel striping alone at the new road's broad intersections with the Yavapai spur road and East Rim Drive was confusing motorists more than helping them. They also noted the need for a parking

lot to go along with the new visitor center under construction near the pioneer cemetery. Administrators, landscape architects, and BPR engineers met in 1955 to correct these deficiencies.[41]

BPR engineers and landscape architects quickly addressed the intersections and parking lot within a reconstruction project of East Rim Drive. They designed landscaped, masonry-curbed islands to channel traffic at the intersections which would require 6,030 linear feet of masonry curbing, arranged through Western States Stone Company of Ash Fork ($1.29/foot); 550 cubic yards of topsoil, available from a pit 3/4 mile west and 1-1/2 miles north of the south entrance station; and seeding and planting labor. At the visitor center, the parking project would include walks and placement of 8,000 square feet of flagstone in front of the building, available from the same Ash Fork stone company at $23.00/ton (a ton would cover 130 square feet). The BPR called for bids for the entire project in Spring 1956 and USDI awarded the $571,500 contract to Rogers Construction Company of San Diego, California in May 1956.[42]

The contractor made the modifications to South Entrance Road as noted above within the larger East Rim Project, which ran from 25 May 1956 to 28 June 1957. Work included the parking lot (beside road stations 41+50 and 50+80), flagstone and drinking fountains at the visitor center, and traffic channelization islands at the Yavapai spur road (Stations 72+68 to 85+57) and East Rim Drive (Stations 140+30 to 153+38). Day labor forces within this project erected the south entrance sign built by the Yosemite National Park sign shop, and guardrails at Mather Point. They also planted "thousands of native plant, shrubs and bushes" upon the traffic islands at a cost of $6,500.00[43]

Coincident with the above work, the BPR put together plans and specifications to repair and surface South Entrance Road from beginning to end, and included this work within a contract to resurface the roadway south of the park boundary as far as the national forest boundary west-southwest of Red Butte. USDI awarded the $346,200 contract to Sorensen Construction Company of Murray, Utah, in Summer 1956. The contractor completed the project during October 1956 through August 1957. Exact lengths of the project included the entire South Entrance Road from Station 0+00 through 391+77 (7.416 miles), the Yavapai spur road from Station 0+15 through 15+99 (0.3 miles), and the south approach road from Station 391+77 through 966+07 (13.118 miles), for a total project length of 20.834 miles. There may also have been a slight realignment at the south end of the park entrance road within this project.[44]

Work consisted of placing 2-1/2" of bituminous plant-mix (Type F-1 dense graded) bottom course, and 1/2" of bituminous mix finish

(Class F pavement) surface course on all segments of the 30'-wide South Entrance Road, with only a 1" bottom course and 1/2" surface course placed on the 34'-wide approach. An emulsified asphalt grade SS-1 spread at an average rate of 0.06 gallons per square yard was applied to the existing prime base and bottom surface course as a tack coat. Liquid asphalt 150-200 penetration was mixed at an average rate of 6.12 percent of the weight of aggregate to produce the bottom and finish surface courses. An Asphalt grade 150-200 penetration was applied as a flush coat at an average rate of 0.06 gallons per square yard. This project also included placing crushed gravel shoulder material, topsoil, and seed along the roadway.[45]

Escalating traffic congestion at the visitor center and nearby commercial services area by the late 1960s prompted the NPS to undertake miscellaneous improvements to South Entrance Road and the visitor center parking area in 1970. Most work went into the business area, however, including the lovely masonry wall south of that parking area, walks, masonry curbing, a paved roadway from South Entrance Road to the Yavapai Lodge, and a curbed traffic island at the turn to Babbitt's Store. Work along South Entrance Road included substantial roadway modifications, two concrete drop inlets, 420 linear feet of stone curbing, and a bituminous sidewalk and trail at the visitor center and amphitheater. Bish Contracting Company, Inc. won the contract for $392,000, only $31,000.00 of which was for work associated with the entrance road and visitor center parking area. The project ran from 22 May 1970 through 31 August 1971.[46]

The brief completion report for this project is unclear as to exactly what work was done to the entrance road. It suggests that the entire roadway segment fronting the visitor center and parking lot was regraded and surfaced, and clearly mentions that traffic channelization islands were installed (probably as seen today). Tasks mentioned included subgrade preparation, grading, base course, paving stone curbs and wall, and topsoil and seeding along shoulders. The report suggests that the roadway may have been entirely realigned in this section. Mention is made of removing an old asphalt mat and lowering of the grade to prevent excessive tree clearing, and project tasks do suggest new roadway construction (subgrade, grade, base course,...). Today, an old road alignment is noticed immediately east of the NPS parking lot east of the visitor center. It may have been a road segment bypassed in this 1970-71 project (?).

An interesting facet of this project entailed the immediate erosion of the asphalt surfacing, which was traced by laboratory tests to the use of aggregate from the Little Colorado River. Technicians determined that Little Colorado aggregate contains bentonite clay particles which disintegrate under traffic stress

when wet, and is also subject to stripping. To correct the problem, all project road surfaces were overlaid to a depth of one inch using 3/8" basaltic aggregate from the Tanner Pit at Williams. All surfaces were then given a final chip seal.[47]

Most work along South Entrance Road since 1971 has consisted of standard maintenance activities, including striping, resurfacing as required, overlays, chip-sealing, patching, and culvert cleaning. According to Joe Bice, GCNP Roads Supervisor, the park tried something different by doing a white-shaded chip seal with red cinder shoulders along the roadway in the 1970s. This was not continued, as it is difficult to match colors when patching, but the roadway color still fades over time as black bituminous oil wears away to the white lime aggregate beneath.

Today, South Entrance Road requires progressively more attention the closer it gets to Village Loop Drive as vehicles enter from East Rim Drive and traffic coagulates around the visitor center toward the Village Loop intersection. During the course of this study, it was noted that this last segment of roadway is badly cracked, patched, and deteriorating. Road crews were busily at work excavating deeply beneath the subgrade near the Fred Harvey garage on one project, while a cursory surfacing project was completed on another occasion time. These are stop gap measures as the road is due for resurfacing in the near future.[48]

One final major alteration to South Entrance Road consisted of the new entrance station, constructed at its present location in 1987, which replaced the 1958 station near the Center Road intersection. This beautiful example of "rustic revival" architecture was designed at the western regional office and constructed by Ron Lewis Construction of Moapa, Nevada. The initial entrance roadway was reconstructed within this project, extending from the new entrance sign and entrance parking area at the boundary through the 3-booth, 3-lane station, and beyond several hundred feet to the north.

Description

The South Entrance Road as constructed in 1954 begins at Station 0+00 at the intersection with Village Loop Drive between the old superintendents' residence and the Fred Harvey garage. Traffic between the two roads is channeled by the landscaped traffic island at this point which dates to the earliest automotive version of East Rim Drive (late 1920s). The island today, as sixty years ago, is landscaped with native grasses and several old ponderosa pines. The roadway just east of the intersection is 26' wide with 12' lanes. Placed monolithic boulders line the garage on the south to keep vehicles from parking next to the

building. Drainage at the intersection is directed into a double culvert on the south side of the roadway which funnels storm water beneath Village Loop into Bright Angel Wash on the south side of the RR tracks. This double culvert boasts a CCC masonry headwall, the only masonry structure along the entire entrance road dating to the 1930s. It is 12' long x 5' high x 2' thick with 36" CMP culverts.[49]

The road climbs eastward from the intersection along a gentle grade through ponderosa pines on the south and pinon-juniper on the north, the disparity in life zones caused by the north and south facing slopes of Bright Angel Wash. Landscape transitions to all ponderosa pine as the roadway passes out of the drainage and approaches the visitor center area. Within this approximate 0.9 mile road segment there are few culverts. Three noted consist of bare CMP draining north to south under the roadway with metal apron end sections on the south side. Two of these have an earthen berm catch basin on the north side which stops water flow long enough to funnel it through the culvert under the road. There are no walks along the road, but a wide, informal path runs parallel from the Harvey garage area to the visitor center area about forty feet south of the road. The few tourists who walk between the village and the visitor center (most hop back in their cars and drive it or catch the shuttle) use this path, or the developed trail along the Canyon rim. There is no curbing along this segment of road, although there are a few boulders at points on the south side to prevent motorists from striking out cross country.

This 0.9 mile road segment is in the worst condition of any along the entire 7+ mile entrance road, evidencing potholes, cracks, and generally rough surfacing (though road crews keep after it). Part of the problem is the grade, which is not inordinately steep but is nonetheless the steepest along the entire route. Another problem is traffic, which is heaviest here between the two developed areas. Despite a free shuttle which runs between the two points and is heavily used, all manner of commercial and private vehicles incessantly ply this route during daylight hours. Joe Bice indicates that the shuttle trams do indeed help relieve congestion, but the weight of these fully-loaded vehicles may cause more road damage than if each passenger drove their own vehicles. Solutions beget problems.

As one approaches the developed area, the roadway broadens to 30' across, but lanes remain 12' wide. A directional sign indicates that the visitor center is on the left and backcountry services on the right. At this point a left turn brings the visitor into the west end of the long parking lot, just as the entrance road is divided by a traffic channelization island.

The parking area has standard features of park road pullouts, including the 1950s-style masonry curbing on both north and south sides of the lot. The rock is larger than standard, however, measuring 24" to 30" long. A 5'-wide bituminous walkway fronts the north side of the lot from the west side all the way to the visitor center, and is itself fronted by a 3-rounded-rail wooden fence, painted brown. Visitors along the walkway access points to the north, including the pioneer cemetery, Shrine of Ages, campfire talk amphitheater, rim trail paths, and at the east end of the lot, the visitor center and administrative offices. At the east end of the visitor center the road curves back to the entrance road and forms one arm of the intersection which allows access to the business district (Yavapai Lodge, Babbitts Store...). The parking lot and entrance road are separated by an island about 35 feet in width, landscaped with grasses, sage, ponderosa, and juniper. In the late morning of the day these observations were made, every parking space was filled and vehicles paused throughout the lot waiting for someone to leave.

Returning to the beginning (west end) of the visitor center area, the first road structure encountered is the 1970 channelization island which divides the road. This island is initially 4' wide with an unusual river-rock cobblestone surface, then broadens to about 9' wide with grass and sage landscaping. The island is entirely bordered by masonry curbing. The north lane, one way west, is 18' wide curb to curb. The south lane, one way east, is only 13' wide and lacks curbing on the south side. Up the road a little, the center island narrows in order to channel traffic into a second left turn into the parking lot. At this same intersection, vehicles moving west in the north lane are channelled by the island (which continues after the break at the intersection) into a left turn lane to the backcountry services area. Traffic seems to flow fairly well in this immediate area, as relatively few people turn here.

At this same intersection, masonry curbing lines all four rounded roadway corners, with the curbing continuing north into the parking area. At the east side of the intersection a culvert runs south to north under the roadway with a common metal apron on the north side. There is a drop inlet in the south lane at this point. The culvert pipe is distorted from the weight of traffic.

The entrance road continues divided by the center island for another 150-200 yards to the intersection for the south side business district. This island is at first 4' wide (to accommodate the turn lane) with a cobblestone surface, then broadens to eleven feet with grass and shrub vegetation. Masonry curbing surrounds the island, but there is no curbing along the roadway on either the north or south sides through this entire

segment. Placed boulders and an occasional horizontal log on both sides take the place of masonry curbing, and seem to keep motorists from parking along the roadway. About thirty yards west of the business intersection, a walk painted on the pavement allows pedestrians to cross between the business district and the visitor center. The center island forms left turn lanes at this intersection, then dissipates to the east having served its purpose to channel traffic through this heavily-congested area. The south lane between the intersection and the service station on the south side of the roadway is channeling (sinking) badly, indicating subgrade damage from the weight of vehicles.

Prior to the middle 1950s, nothing existed in this area other than the pioneer cemetery and the lonesome East Rim Drive on its way from the village to Desert View. Most of the developed area described dates to initial construction in the 1950s and to modifications of the 1970-71 reconstruction project. It is very possible, however, that minor changes and improvements have been made in subsequent years, since the quantity of materials described in the 1971 project completion report do not add up to the myriad masonry curbs and walks. It is also likely that all roadway and parking areas have been resurfaced or chip sealed in the intervening 23 years.

Visitors experience relief as they emerge east of the developed area with an open road ahead. Just beyond the service station, the surfaced roadway measures 30' across with 12' lanes and 3' shoulders. The speed limit--25 miles per hour through the developed area--returns to 35 miles per hour while the landscape transitions from ponderosa pines to a more open pinon-juniper forest. The pavement is smoother and motorists accelerate more toward 45 mph than the posted limit.

Not far up the road, one comes to the Yavapai Point turnoff on the left. Another traffic island, that constructed in 1956, rises from the asphalt to direct vehicles into a left turn lane. This island has masonry curbing all around and continues on the east side of the intersection to channel traffic from the other direction. Both segments are landscaped with agave, grasses, sage, and other shrubs. The spur road to Yavapai Point and museum is several hundred yards long, masonry-curbed on both sides, and measures 25' curb to curb with 11' lanes. At the end of the spur is a broad loop with plentiful parking, especially on the east side where long lanes accommodate buses. A broad walkway begins on the east and runs around to the shuttle bus stop and museum footpath on the north end. The walk is separated from the parking surface by modern masonry curbing and is fronted by a 3-rounded-rail fence, painted brown. This is the loveliest and largest parking loop in the park with a "rustic revival" shuttle bus shelter and long central island, heavily landscaped

and surrounded by another masonry-curbed, 9'-wide walk and wooden rail fence.

The entrance road continues east and southeast from the Yavapai spur through an area of rounded slopes naked of vegetation. The white Kaibab limestone earth is striking at this point, so much so that it seems to attract motorists who pullover and parallel park along the roadway. This road segment is near the Canyon rim so people get out and saunter over to take a peek. It is unknown if the park administration encourages this parking, but no signs nor obstructions discourage it.

Not far east of this point is the Mather Point pullout. A landscaped island varying from thirty to fifty feet wide separates the parking area from the entrance road, with exits/entrances on the west and east ends. These entrances are hazardous because the long scenic pullout is popular as the first Canyon-view pullout for visitors entering the park from the south. Vehicles travelling from 40 mph to 50 mph along the broad sweeping curve of the entrance road (despite the 35 mph limit) decelerate quickly to enter the pullout, while exiting vehicles turn east and west in equal proportions. The painted lanes at these two intersections are awkward, and entirely ignored.

The pullout itself offers perpendicular parking on the Canyon (north) side and parallel parking for larger vehicles on the roadway (south) side, both sides masonry-curbed the entire length of the pullout. The Canyon-side parking area is fronted by a bituminous walkway, but the Canyon rim is another few dozen feet to the north with lovely natural landscaping intervening. The rim is lined by the interesting metal guardrail described for other park scenic drives (see Haer No. AZ-42, West Rim Drive) the entire length of the parking area and a little farther to the east. An asphaltic walkway leads out to the actual point and is surrounded by the metal guardrailing.

From Mather Point, the entrance road begins a very broad curve toward the southeast until heading almost due south, at which point the intersection with East Rim Drive is reached. This intersection used to be a few hundred feet farther to the south and was moved and reconstructed as part of a realignment project after the 1950s. Masonry-curbed and landscaped islands (1956) on the entrance road channel traffic at the intersection. South bound traffic continues unimpeded while a left turn lane formed by the island allows access to East Rim Drive; north bound traffic flows along the island, with a right turn lane offered to access East Rim Drive. Vehicles turning left (south) from East Rim Drive cross the north bound lane between the islands before entering the south bound lane. Vehicles turning right (north)

from East Rim Drive have an acceleration lane before merging with north bound traffic.

From this intersection, the entrance road continues in a fairly straight line almost due south to the park's south boundary, and remains 30' wide with 12'-wide lanes, 3'-wide paved shoulders, and a speed limit of 45 mph. Leaving the rim area, the landscape returns to mostly ponderosa pine forest, laced with live oak, juniper, and pinon. A few hundred feet south of the intersection one passes the old East Rim Drive alignment which is revealed by the power lines crossing the entrance road, a mule crossing, and an absent-tree line to the east and west. The roadway remains broad with a few gentle dips, rises, and curves to the intersection with Center Road.

The Center Road intersection has masonry-curbed and shrub-landscaped islands in the center of the entrance road on the north and south sides. One can turn left (east) here, although there is no left turn lane, and access the old 1913 entrance road alignment (obliterated in 1954) along a modern gravel road. Traffic may also turn right (west) onto Center Road. Vehicles travelling north along the entrance road are provided a left turn lane formed by the traffic island. Vehicles turning right (south) from Center Road enjoy an acceleration lane before merging with south bound traffic. This intersection was configured in 1954 when the entrance road was first built, and the entrance station until 1987 stood just a few yards to the south.

From Center Road, South Entrance Road continues due south through increasingly thicker stands of ponderosa pine. There are a few moderate cuts and fills, but the roadway is designed with dips and rises to break up an otherwise monotonous tangent. Culverts at the bottom of cuts are of bare CMP with metal apron end sections dating to original construction in the 1950s. The speed limit continues at 45 mph, but the road is so well-engineered that many motorists do 55 mph or better through this straightaway segment. The condition of the roadway from the visitor center area to the south boundary is excellent, and except for the intersections with East Rim Drive, Center Road, and the south entrance, appear untouched by reconstruction or realignment since the 1950s.

The south entrance station, constructed in 1987, consists of three masonry and wood toll booths covered by two peaked roofs of shake shingles. The "rustic revival" architecture and fine craftsmanship of these structures are best described by the professional large format photographs which accompanied this project, the field photographs submitted with this study, and construction drawings available at GCNP Professional Services.

The roadway itself is well thought out and engineered as entering traffic splits easily into three lanes to pass to the east side of each entry booth, then merges easily back into one northbound lane. The west two lanes are 11' wide, the east lane 13' wide, and the single exit lane, which is separated from entrance structures by landscaped islands, is 15' wide. The roadway on which the entry booths are situated is of concrete rather than the standard roadway asphalt.

The park entrance sign and adjacent parking area (1987) is approximately 0.2 mile south of the entrance station, on the east side of the roadway. The masonry sign foundation is built atop a broad, irregularly shaped concrete pad, and the entire area is intricately landscaped with ponderosa and pinon pine, gambel oaks, Apache plum, sage, squawberry, yucca, and native grasses.

CONCLUSIONS/SIGNIFICANCE

Visitors to Grand Canyon National Park have for more than one hundred years entered the park in the greatest numbers from the south. In the earliest years, parties rode stages operated by private tourism entrepreneurs along dirt wagon roads of their own creation to small camps and hotels at Bass Camp and Grandview. With the Grand Canyon Railway's arrival at the head of the Bright Angel Trail in 1901, visitors immediately abandoned the bumpy all day stage experience for a three hour Pullman ride, thereby hastening the birth and steady growth of Grand Canyon Village surrounding the depot. When motorists began to arrive in numbers during the 1910s, they found the best accommodations and services at the village, and by their patronage further stimulated its growth. By the time automotive travel eclipsed that of the railway in 1926-27, it had become a foregone conclusion that any road approaching the park from the south would terminate at Grand Canyon Village.

Superintendent Peters in 1919 succinctly framed with a few words the automotive challenge at Grand Canyon National Park within the context of early overall NPS strategy. Congress would never set aside significant amounts of land and money for the national parks unless voters pressured them to do so. Voters would not have reason to pressure their legislators until they experienced the majesty of existing parks, and could not do so until they had convenient means to visit the parks. The number of motorists had exceeded railway passengers (or nearly so) by the early 1920s and since the trend was irrefutable, NPS strategists, especially Stephen Mather and Horace Albright, focused on construction of modern automotive roads and alliance with the era's premier road building agency, the Bureau of Public Roads. The number of quality roads built by this partnership in the 1920s and 1930s

alone--many of which still follow original alignments--is simply staggering.

It is within this overall strategy and partnership that Grand Canyon's South Entrance Road achieves significance as one of the earliest of automotive roads planned and constructed by the BPR and NPS. As noted in this report, BPR Engineer Donald Evans came to Grand Canyon and surveyed five new roads even before the two government agencies formalized their agreement in 1925. Since Superintendents Peters and J.R. Eakin consistently agitated for a better road entering the park from the south, it is likely Evans surveyed South Entrance Road first. In any event, the BPR, NPS, and contractor James Vallandingham completed it first, and the results--in combination with progress on the approach road from Williams during 1928-32 (also built by the BPR)--fulfilled Peters' hopes of capturing more of the transcontinental traffic along the new United States Route 66.

Unfortunate historical aspects of the 1928 entrance road are that it no longer exists for its original purpose as an entrance road, less than half its length is extant, and it has lost nearly all of its associated historic structures. The alignment from Moqui Lodge to Center Road can easily be traced, but contractors and boy scouts obliterated the nearly four mile long segment in the 1950s and no structures remain. Center Road until this year boasted some fine examples of CCC culvert headwalls, but most if not all (save one) are gone as of this writing. It may be that by next year, nothing of the old roadway will remain but the 1.6-mile alignment that is Center Road and the stone curbing fronting Ranger Ops.

Although the 1928 road's slow disappearance is regrettable, it is eminently understandable since all roads change over time and some alignments are abandoned to service the needs of changing automotive patterns. South Entrance Road reflects this evolution perfectly with its changing purpose, total realignment in 1953-54 and construction to 1950s automotive standards. This new roadway achieves significance as a representation of how roads have evolved at Grand Canyon National Park.

Even before World War II, a few among GCNP planners began to consider the growth of Grand Canyon Village and the wisdom of funneling a steady stream of visitors directly to its heart. During the war, as park administrators began to plan for postwar improvements, the thought of directing visitors first to the East Rim Drive then to the rim at Mather and Yavapai points before approaching the village seemed one possible means to distribute park traffic which they felt sure would explode. As the park entered the 1950s, the need for a new alignment also became a function of planning for the new visitor and commercial zones

between Yavapai Point and the village. Thus, the reason for an entrance road--to funnel visitors to available services and sites--remained the same, but the purpose required a new alignment.

While the 1928 entrance road was the first automotive road completed at the park, the 1954 entrance road was the first built or reconstructed after the war to address changing infrastructure and visitation patterns. It also for the first time reflected changing ideas concerning visitors' appreciation of the park, and trends within NPS architectural schools of thought. The two forms of change are to some degree the same, as utility, economy, and sheer numbers of visitors have influenced both.

Although this study did not consider the terrain through which the 1928 road passed in any depth, nor the physical qualities of the road other than what was found in the single completion report, it is evident by observation today that the old road was built like many other NPS roads of the 1920s and 1930s to handle perhaps 20,000-30,000 light to moderate weight vehicles per year. With obliteration, the roadway may have been regraded to natural contours, but today's topography and vestiges of the alignment suggest that vehicle speeds were limited to 25-35 mph. At these speeds, visitors had more time to appreciate associated road structures such as a masonry portal, masonry culvert headwalls and retaining walls. The NPS and BPR designed these early roads with fewer cuts and fills, steeper grades, sharper curves, scenic vistas, and aesthetic constructions with slower speeds in mind.

By the 1950s, vehicles entering the park numbered in the hundreds of thousands, not the tens of thousands, and again the trends were even scarier than the figures. Annual visitation approached one million while superintendents wailed at conditions prosperity had wrought (while dreaming for better facilities to accommodate more). The new entrance road with its greater width, more gentle grades, longer tangents, and no rustic-style aesthetic features reflects this escalating traffic pattern, and a new capability to move visitors from Points A to B with fewer stops, greater efficiency, and speed, thus run them through the park quicker. Although limits increased to only 45 mph, South Entrance Road was designed to easily handle 50-55 mph speeds and park personnel well understood that the postwar generation of motorists, who were in a hurry whatever their destination, were already doing better than that.

A faster, wider, sleeker south entrance road with few distracting aesthetic features also reflected the postwar economy, which favored more roadway for the dollar and fewer frills. The beauty of early BPR roads is owed the labor that went into them when laborers worked diligently for 50 cents per hour. In the 1920s

and 1930s, beautiful ashlar masonry structures of weathered stone of varied hues actually cost less than the same structures built of concrete. Too, Grand Canyon like all national parks benefitted in 1933-42 from the young men of the CCC who worked even cheaper and built many of these roadside structures. After the war with labor unions, minimum wage laws, and mandatory 40-hour work weeks in place, labor-intensive projects gave way to fewer skilled workmen operating more powerful machines. Roads as well as buildings succumbed to these economies.

Architectural trends which favored the utilitarian look and honest use of building materials also had some effect on design and construction of South Entrance Road. Writers say more of buildings when they discuss architecture, but there is no doubt that early NPS landscape architects viewed roads in the same artistic light. Chief Landscape Architect Thomas Vint and others of his staff were immersed in the rustic style through the 1930s and dominated design of NPS roads as well as buildings. By the end of the 1930s, however, Vint's staff had grown from 16 to more than 200, and most of the newcomers viewed the rustic style as a romantic affectation. As these men and women came onto positions of power following the war, there was little trouble convincing them that economies called for streamlined structures of modern materials. They had already been sold in school.

South Entrance Road as completed in 1954 is significant because it mirrors the visitational, economic, and architectural changes which emerged at Grand Canyon National Park and other western parks after World War II. It was the first GCNP road to so evolve, and set the pattern for others over the following ten years.

ENDNOTES

1. GRCA Map 27727, Grand Canyon Study Collection (GCSC).

2. "Excerpts from Report Made Jan. 25, 1910 to Forest Supervisor F.C.W. Pooler, Forest Supervisor, On Roads and Trails in Grand Canyon Division," brief synopsis of roads, [1910], Misc--Old Roads & Trails in the Park, 1923-1944, Grand Canyon National Park Library (GCNPL).

3. M.R. Tillotson, Assistant Engineer, to Superintendent Crosby, memorandum, 3 September 1923, Misc--Old Roads & Trails in the Park, 1923-1944 File, GCNPL; James Shirley, interview by author, 2 February 1994, Tape Recording.

4. "Road Map to Points of Interest from Flagstaff, Arizona," March 1927, Reference File--Roads, GCNPL. This map depicts the Williams and Maine approach roads and the beginning portion of the Flagstaff approach, already falling out of use by 1927. See also Superintendent's Annual Report, 1920-21.

5. Portions of the old roads mentioned can still be followed today. In June 1994, the author and Mr. Thomas Carmony of Phoenix, AZ, traced major portions of Bass's road from Bass Camp south as far as his overnight camp, "The Caves"; The author has also driven small segments of the Williams road along the RR tracks, and the entire length of the old Maine Road.

6. Superintendent's Annual Report, 1919-20, GCNPL.

7. Superintendent's Annual Reports, 1919-20, 1920-21; James Shirley interview.

8. Superintendents' Annual Reports, 1920-27.

9. Superintendents' Annual Reports, 1924-1928. See also J.R. Eakin, superintendent, to E.B. Wheeler, BPR district engineer, letter, 15 May 1925, Reference File--Roads, GCNPL. The new approach road also had to await decision on where the new road would originate--Flagstaff or Williams. Superintendent Eakin rather neatly sidestepped the hotly-debated issue (which had begun in the 1880s over all southern approaches to Grand Canyon) when engineer Wheeler asked him to help with the new road's reconnaissance.

10. NPS Landscape Engineering Division, "Grand Canyon National Park General Plan for Community Development, " sketch map, 24 June 1924, copy in Professional Services, GCNP.

11. Superintendents' Annual Reports, 1924-27; W.R.F. Wallace, Associate Highway Engineer, "Final Construction Report (1927-28) on Grand Canyon National Park Highway System, Sections 1A1, Rectification and Surfacing, 1A2, 2A1, 2B Grading and Surfacing, 2A2 Surfacing and 1C2 Grading," 1929, Grand Canyon National Park Construction Reports, 1926-1954 Folder, Accession #3594, Box 1 of 2, GCSC.

12. USDI, NPS, "As Constructed Plans for Project 2-A1 (Por.), B, D (Por.) Grading, Base Course & Bit. Treat., Route No. 2--South Entrance," 1953-56, GRCA 113/60209A, copy in Professional Services, GCNP; Wallace, "Final Construction Report, 1929."

13. GRCA Image #140, photograph of the entrance arch, November 1931, GCSC.

14. GRCA Image #s 162, 2165, 2210, 2678B, 4275, and 7991, GCSC, show the old and newer entrance stations located on Center Road and later on the new entrance road. See also Superintendent's Annual Report, 1951-52. The new station is spec'd out in detail in USDI, NPS, Architectural Division, "Checking Station, South Rim," construction drawing, 19 July 1951, NP-GC 2317, copy in Professional Services, GCNP.

15. C.M. Carrel, park engineer, "Avenue 'A'--Grading, Drainage, Gutters, and Surfacing," project report with photographs, [ca. 1936], GCSC; M.R. Tillotson, Superintendent, "Final Construction Report on Service Roads," report, 28 March 1931; both reports in Grand Canyon National Park Construction Reports, 1926-1954, GCSC.

16. Alfred C. Kuehl, "Summary Report--E.C.W. Work Projects C.C. Camp Number 819--June 1 - Oct 15," report with photographs, [1933], Accession #157.04, Box #4, Folder #4, GCSC; Superintendent's Annual Report, 1932-33.

17. Superintendent's Annual Report, 1937-38; USDI, NPS, "As Constructed Plans, 1953-56."

18. GRCA Image #13950, photo of old service station, 1950, GCSC; Superintendent's Annual Report, 1938-39, with attached photo of station.

19. Superintendents' Annual Reports, 1940-52.

20. "Road Routes, Grand Canyon National Park (Appendix to Chart of Accounts)," 27 October 1958, Reference File--Roads, GCNPL.

21. GRCA Image #2699, Boy Scouts planting seeds, December 1954, GCSC; Anderson, field photographs, May - June 1994, show the old alignment in 4-5 exposures.

22. The author spoke to the masons on this project while they were at work. They all live in Mexico and do the same kind of work at home. They are a subcontracting crew on this project, completing all curbing and culvert headwalls--cutting, chiselling, shaping, and fitting the local sandstone blocks at the work site.

23. GRCA Image #2922-B, photograph of the two-story store and traffic island, GCSC.

24. USDI, NPS, "Grand Canyon National Park Minor Roads--Headquarters Area," construction sketch map of plaza area, 1935, GRCA #113/5066 (microfiche), copy in Professional Services, RR depot annex.

25. GRCA #s 2922-B, 14019, 14017, 2977, 9492, GCSC, and many other photos of the intersection depict its uncluttered appearance. See also the many CCC reports in the study collection, some of which include snapshots of public works crews landscaping the area.

26. GRCA Image #s 285, 2912, 4693, 16095, photographs of roadside landscape, and photographs attached to CCC reports, GCSC.

27. Author's observations, notes, and field photographs, May - August 1994. These materials serve for the following paragraphs' description as well.

28. See HAER No. AZ-35 and associated reports for the history, appearance, measurements, etc. of five of these CCC headwalls at the intersections with Apache and Boulder streets.

29. Superintendent's Annual Report, 1945-46.

30. USDI, NPS, "Current Road Proposals, South Entrance Road Relocation, Grand Canyon National Park," sketch map, 13 February 1947, NPGC 2245, copy in Professional Services, GCNP.

31. USDI, NPS, "Approach Road, Grand Canyon National Park, sketch map, July 1950, WODC-GC 9105, copy in Professional Services, GCNP. This map covers a broad area and is actually concerned with depicting a new approach road through Kaibab National Forest, but seems to indicate the "T" intersection without a loop.

32. Superintendent's Annual Report, 1951-52.

33. USDI, NPS, "As Constructed Plans for Project 2-A1 (Por.), B, D (Por.), 1953-56, Sheet 1 of 20; GRCA Image #2585, 1953, photo of Fisher Contracting Company shovel at work near Yavapai Point, GCSC; "Reconnaissance Report, East Rim Drive, Grand Canyon N.P. Route 1," [1954], D30--East Rim Drive 1954-1956, GCNPL.

34. Department of Commerce (DOC), BPR, "Final Construction Report, Grand Canyon National Park Highway Project 2-A1 (Por), B, D (Por) and South Approach to Grand Canyon National Park--A (Por)," 1954, GRCA 61773, Box 2, GCSC.

35. DOC, BPR, "Final Construction Report... Project 2-A1 (Por), B, D (Por), 1954"; USDI, NPS, "As Constructed Plans For Project 2-A1 (Por.), B, D (Por.)."

36. USDI, NPS, "As Constructed Plans for Project 2-A1 (Por.), B, D (Por.), Sheet 14.

37. USDI, NPS, "Entrance Station, South Rim, Grand Canyon National Park, Contract No. 14-10-315-165," completion report with attached photographs, 20 September 1958, GRCA 61773, Box 1, GCSC; GRCA Image #2165 and 2678B, photographs of Center Road entrance building as constructed (1951) and being moved to the new entrance road (22 September 1954), GCSC.

38. USDI, NPS, "Entrance Station, 1958"; GRCA, Image #4275, 15 July 1963, photo of two buildings at entrance station, GCSC.

39. USDI, NPS, "As Constructed Plans for Project 2-A1 (por.) B, D (Por.)," Sheet 13.

40. GRCA Image #3489, 9 June 1959, entrance signs, GCSC.

41. Robert G. Hall, landscape architect, to Chief, Western Region, memorandum relating field reconnaissance, 28 April 1955, D30 East Rim Drive 1954-1956, GCNPL.

42. F.R. Bonnickson, engineer, to Sanford J. Hill, Chief, Western Office, letter, 25 July 1955; James S. McLaughlin, GCNP Superintendent to Chief, Western Office, memorandum, 12 October 1955; Paul C. Thomas, landscape architect, to GCNP Superintendent, memorandum, 30 September 1955; B.M. French, BPR district engineer, "Notice to Bidders," [1956]; Thomas J. Allen, NPS assistant director, to USDI Assistant Secretary, memorandum, 1 May 1956; all in D30 East Rim Drive 1954-1956, GCNPL.

See also DOC, BPR, "Final Construction Report, Grand Canyon National Park Project 1-A (Por) and 2-D Por), East Rim Drive & South Entrance Road," 1956-57, GRCA 61773, Box 5, GCSC.

43. USDI, NPS, "Final Construction Report... East Rim Drive and South Entrance Road, 1956-1957."

44. GRCA Image #3340, photo of south entrance road, 12 June 1957, GCSC has a caption which reads "Looking north... a short distance within boundary at nearly completed realigned road showing typical

MISSION 66 sign." This looks like the road segment immediately north of today's entrance station.

45. DOC, BPR, "Final Construction Report, Grand Canyon 2-A1 (Por.), B, D, E, and South Approach A (Por.)," 1956-1957, GRCA 61773, Box 5, GCSC.

46. USDI, NPS, "Completion Report, Business Zone Parking & Roads, R-151; Access Road, Parking Area & Walks at Administration BLDG, R-132," 1971, GRCA 61773, Box 2, GCSC.

47. USDI, NPS, "Completion Report, Business Zone Parking & Roads, 1971."

48. Joe Bice, GCNP Roads Supervisor, interview with author, 28 July 1994, tape recording; author's field observations, May-August 1994.

49. This description is from the author's field notes, observations and photographs of May-June 1994. Allusions to historical data are from sources already noted in this report.

50. The as constructed drawings are GRCA 113-41,135B, "South Rim Entrance Road, Entrance Station," 1987, a copy obtained from the DSC-TIC and now held by GCNP Professional Services. These include detailed landscaping and construction drawings for the roadway, entrance structures, and entrance sign area.

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Carmony, Thomas and Michael F. Anderson. Field observations, June 1994.

Carrel, C.M. "Avenue 'A'--Grading, Drainage, Gutters, and Surfacing, [ca. 1936]." Grand Canyon National Park Construction Reports, 1926-1954, GCSC.

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"Excerpts from Report Made Jan. 25, 1910 to Forest Supervisor F.C.W. Pooler, Forest Supervisor, On Roads and Trails in Grand Canyon Division, [1910]." Misc--Old Roads & Trails in the Park, 1923-1944, GCNPL.

GRCA Image #s 140, 162, 285, 2165, 2210, 2585, 2678B, 2699, 2912, 2922B, 2977, 3340, 3489, 4275, 4693, 7991, 9492, 13950, 14017, 14019, 16095. GCSC.

Kuehl, Alfred C. "Summary Report--E.C.W. Work Projects C.C. Camp Number 819--June 1-Oct 15, [1933]." GCSC.

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"Reconnaissance Report, East Rim Drive, Grand Canyon N.P. Route 1, [1954]." D30--East Rim Drive 1954-1956, GCNPL.

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Wallace, W.R.F. "Final Construction Report (1927-28) on Grand Canyon National Park Highway System, Sections 1-A1, Rectification and Surfacing, 1A2, 2A1, 2B Grading and Surfacing, 2A2 Surfacing and 1C2 Grading, 1929." Grand Canyon National Park Construction Reports, 1926-1954, GCSC.

Minor reports, letters, and memoranda identified in the notes were taken from the following files at Grand Canyon Library:

Misc--Old Roads & Trails in the Park, 1923-1944.

Reference File--Roads.

D30 East Rim Drive 1954-1956.